



A Land-Grant University

*Fully accredited by
the Southern Association of Colleges and Schools since 1922.*

Auburn University is an equal opportunity educational institution

AUBURN UNIVERSITY BULLETIN

USPS 036-900

Volume 84

Number 1

April 1989

Published four times yearly — April, June, October,
and December,
by Auburn University, Alabama 36849-5109.
Second-class postage paid at Auburn, Alabama 36830.

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NOTE

The statements set forth in this bulletin are for informational purposes only and should not be construed as the basis of a contract between a student and Auburn University.

While the provisions of the bulletin will ordinarily be applied as stated, Auburn University reserves the right to change any provision listed in this bulletin, including but not limited to academic requirements for graduation, without actual notice to individual students. Every effort will be made to keep students advised of any such changes. Information on changes will be available in the Office of the Registrar and/or the Office of the Dean. It is important that each student be aware of his or her individual responsibility to keep apprised of current graduation requirements for the student's respective degree program.

CIVIL RIGHTS COMPLIANCE

Auburn University is an equal opportunity educational institution and students are admitted and treated without regard to race, sex, color, age, religion, national origin or handicap. The University is in compliance with the regulation of Title IX of the Education Amendments of 1972, Sections 503/504 of the Rehabilitation Act of 1973 and the Vietnam Era Veterans Readjustment Assistance Act.

If any student wishes to file a complaint covered by the above stated laws and rules and regulations pertaining thereto, that student should go to the Affirmative Action Office.

EQUAL EMPLOYMENT OPPORTUNITIES

It is the policy of Auburn University to provide equal employment opportunities, including provisions for training for personnel mobility, for all individuals without regard to race, sex, age, religion, color, national origin, or handicap.

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UNDER THE ORGANIC and statutory laws of Alabama, Auburn University is governed by a Board of Trustees consisting of one member from each congressional district, as these districts were constituted on January 1, 1961, an extra member from the congressional district in which the institution is located, and the Governor and State Superintendent of Education, who are members *ex officio*. The Governor is President. Trustees are appointed by the Governor, by and with the consent of the State Senate, and hold office for a term of twelve years, and until their successors are appointed and qualified. Members of the board receive no compensation. By executive order of the Governor in 1971, a non-voting student representative selected by the Student Senate serves as a member *ex officio*.

The Board of Trustees places administrative authority and responsibility in the hands of an administrative officer at Auburn University. The institution is grouped for administrative purposes into divisions, colleges and schools, and departments.

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Student Body Representative, non-voting	Auburn University at Montgomery

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University Librarian

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Chairman, General Faculty

UNIVERSITY CALENDAR

1989-90

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1989 Summer Quarter (47 class days)

Eight Week Term (36 class days)

June 1, *Thurs.* Last day for completing applications for admission

June 15, *Thurs.* Orientation for new students

June 16, *Fri.* Final Registration and Schedule Adjustment

June 19, *Mon.* Classes begin

July 3-4, *Mon.-Tues.* Independence Day Holidays

July 17-21, *Mon.-Fri.* *Registration for Fall Quarter

July 25, *Tues.* Mid-Quarter

Aug. 9, *Wed.* Classes end for term

Aug. 10-11, *Thurs.-Fri.* Final Examinations for Term

Aug. 24, *Thurs.* Classes end for Quarter

Aug. 25, *Fri.* Dead Day

Aug. 26-30, *Sat., Mon., Tues., Wed.* Final Examinations for Quarter

Aug. 31, *Thurs.* Graduation

1989 Fall Quarter (48½ class days)

Sept. 1, *Fri.* Last day for completing applications for admission

Sept. 18, *Mon.* Orientation for new students

Sept. 19-20, *Tues.-Wed.* Final Registration and Schedule Adjustment

Sept. 21, *Thurs.* Classes begin

Oct. 10, *Tues.* General Faculty Meeting

Oct. 17-27, *Tues.-Fri.* *Registration for Winter Quarter

Oct. 25, *Wed.* Mid-Quarter

Nov. 22-26, *Wed. Noon-Sun.* Thanksgiving Holidays

Nov. 30, *Thurs.* Classes end

Dec. 1, *Fri.* Dead Day

Dec. 4-7, *Mon., Tues., Wed., Thurs.* Final Examinations for Quarter

Dec. 8, *Fri.* Graduation

1990 Winter Quarter (47 class days)

Dec. 10, *Sun.* Last day for completing applications for admission

Jan. 2-3, *Tues. 1 p.m.-Wed.* Final Registration and Schedule Adjustment

Jan. 4, *Thurs.* Classes begin

Jan 23-Feb. 1, *Tues.-Thurs.* *Registration for Spring Quarter

Feb. 7, *Wed.* Mid-Quarter

Mar. 9, *Fri.* Classes end
 Mar. 12-15, *Mon., Tues., Wed., Thurs.* Final
 Examinations for Quarter
 Mar. 16, *Fri.* Graduation

1990 Spring Quarter (47 class days)

Mar. 1, *Thurs.* Last day for completing
 applications for admission
 Mar. 26-27, *Mon.-Tues.* Final Registration
 and Schedule Adjustment
 Mar. 28, *Wed.* Classes begin
 Apr. 17, *Tues.* General Faculty Meeting
 Apr. 23-30, *Mon.-Mon.* *Registration for
 Summer Quarter
 Apr. 23-May 3, *Mon.-Thurs.* *Registration for
 Fall Quarter
 May 1, *Tues.* Mid-Quarter
 May 31, *Thurs.* Classes end
 June 1, *Fri.* Dead Day
 June 2-6, *Sat., Mon., Tues., Wed.* Final
 Examinations for Quarter
 June 8, *Fri.* Graduation

****1990 Summer Quarter (47 class days)**

Eight Week Term (37 class days)

June 1, *Fri.* Last day for completing
 applications for admission
 June 14, *Thurs.* Orientation for new students
 June 15, *Fri.* Final Registration and
 Schedule Adjustment
 June 18, *Mon.* Classes begin
 July 4, *Wed.* Independence Day Holiday
 July 16-20, *Mon.-Fri.* *Registration for
 Fall Quarter
 July 23, *Mon.* Mid-Quarter
 Aug. 8, *Wed.* Classes end for Term
 Aug. 9-10, *Thurs.-Fri.* Final Examinations
 for Term
 Aug. 22, *Wed.* Classes end for Quarter
 Aug. 23, *Thurs.* Dead Day
 Aug. 24-28, *Fri., Sat., Mon., Tues.* Final
 Examinations for Quarter
 Aug. 30, *Thurs.* Graduation

Registration schedules and fee bills will be mailed prior to the beginning of the Quarter. The mailing dates are: for Fall Quarter 1989, August 14; for Winter Quarter 1990, November 20; for Spring Quarter 1990, February 19; and for Summer Quarter 1990, May 15.

*The individual colleges/schools will publish the days of registration that will be utilized during the University registration period.

**All dates in the Summer Quarter are tentative and are subject to final approval prior to 1990-91 catalog printing.

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The University

AUBURN UNIVERSITY, chartered in 1856, is located in Auburn, Alabama, near Interstate 85 in the eastern section of the state. Surrounded by farms and woodlands, the University enjoys the advantages of the security, seclusion, and clear air afforded by a small residential city. The 1,871-acre campus, with 75 major buildings, uncrowded and uncluttered, is distinguished by its buildings, lawns and flowers, trees and playing fields. The Undergraduate Colleges and Schools and a Graduate School have emerged to define and carry out the purposes of the institution. The academic program is fully accredited by the Southern Association of Colleges and Schools.

As a land-grant university, Auburn is dedicated to service to Alabama and the nation through its three divisions of instruction, research, and extension. Instruction is the academic process on campus between professors and students. Research is carried on continually to increase knowledge. Extension programs provide educational services and special assistance throughout the state.

Auburn is proud of its graduates, many of whom have distinguished themselves in the professions, business and industry, government and military service, politics, and athletics. Some 120,000 persons have earned Auburn degrees.

The University traces its beginning to the East Alabama Male College, a private liberal arts institution whose doors opened in 1859. From 1861 to 1866 the college was closed because of the Civil War. The college had begun an affiliation with the Methodist Church before the war. Due to financial straits, the church transferred legal control of the institution to the state in 1872, making it the first land-grant college in the South to be established separate from the state university. It thus became the Agricultural and Mechanical College of Alabama.

Women were admitted in 1892, and in 1899 the name again was changed, to the Alabama Polytechnic Institute. In 1960, the school acquired a more appropriate name, Auburn University, a title more in keeping with its location, size, and complexity. The institution has experienced its greatest growth since World War II, and today enrolls 20,553 students, the largest on-campus enrollment in the state. The majority are Alabama residents.

Auburn University at Montgomery was established as a separately administered branch campus in 1967. The institution has developed rapidly, especially since moving to a new 500-acre campus just east of Montgomery in 1971. The AUM enrollment now stands at 5,580.

Purpose of the University

Auburn University is a comprehensive land-grant university serving Alabama and the nation. The University is especially charged with the responsibility of enhancing the economic, social, and cultural development of the state through its instruction, research, and extension programs. In all of these programs the University is committed to the pursuit of excellence.

The University assumes an obligation to provide an environment of learning in which the individual and society are enriched by the discovery, preservation, transmission, and application of knowledge; in which students grow intellectually as they study and do research under the guidance of a competent faculty; and in which faculty develop professionally and contribute fully to the intellectual life of the institution, community, and state. This obligation unites Auburn University's continuing commitment to its land-grant traditions and the institution's role as a dynamic and complex comprehensive university.

Auburn University is dedicated to these purposes which have been approved by the faculty and the Board of Trustees:

Providing for its students, a broad general education, enhancement of personal and intellectual development, and specialized education through the University's undergraduate, professional, and graduate programs;

Preparing graduates whose knowledge, intellectual discipline, and experience in the multiple aspects of our culture will be manifest in service to the people in this state, the nation, and the world;

Conducting a broad program of research, both basic and applied, to stimulate the faculty and students in the quest for knowledge, to promote their intellectual growth and development, to broaden the foundations of knowledge, to increase understanding of our world, and to aid society in resolving its scientific, technological, economic, and social problems.

Creating and implementing effective programs of education and service that will provide special assistance throughout the state and the nation through the extension of the scientific, professional, and cultural resources of the University to individuals, communities, institutions, and industries, thereby contributing to an improved technology, better environmental and health conditions, enhancement of the general quality of life, and the development of a more responsible citizenry;

Fulfilling the University's responsibilities for instruction, research, and service in science and technology, including agriculture and engineering and programs in biological sciences, mathematics, physical sciences, social sciences, and statutory mandate for the Alabama Agricultural Experiment Station and the Alabama Cooperative Extension Service;

Encouraging scholarly and creative efforts in the arts and humanities so that the University may serve its students and the larger community as a vital source of general education and cultural enlightenment and as a stimulus toward participation of an educated citizenry in all avenues of life;

Fostering programs of education and research in those professional curricula uniquely or traditionally associated with Auburn University.

Auburn University is committed to reassessing its objectives and programs continually in order to assure their consistency with new knowledge and changing economic and social conditions and to seek more efficient and imaginative means of fulfilling the University's purposes.

Research

Auburn University's commitment to the creation and application of knowledge is reflected in the broad programs of research that have developed within the University. The contributions made by the University's faculty and students through basic and applied research have a significant impact on the economic, social, and intellectual well-being of the citizens of the State. These research activities are also essential to the quality of the University's graduate programs.

The organized research programs at the University include the Agricultural Experiment Station established in 1883 and the Engineering Experiment Station established in 1929. Beyond the contributions of these experiment stations, extensive research and other creative activities are performed by faculty in the sciences, humanities, and the arts. Much of this work is supported through contracts and grants awarded by federal and state agencies as well as private businesses and industries.

Extension

Auburn's Extension mission for state, national, and international audiences is accomplished through the outreach efforts of various campus-based units and through the Alabama Cooperative Extension Service, a statewide educational network that links the University's knowledge base to the people and communities of Alabama. ACES' major program priorities are agriculture and forestry, family and individual well-being, natural and human resource development, and revitalization of rural areas.

Campus-based units which provide extension programs that serve industry, government, organizations, and individuals include the Colleges and Schools of Agriculture, Architecture, Business, Education, Engineering (Engineering Extension Service), Forestry, Human Sciences, Liberal Arts, Nursing, Pharmacy, Sciences and Mathematics, Veterinary Medicine, the Graduate School, and University Continuing Education.

Educational Television presents public service programs, and the University library cooperates with public libraries to make materials available throughout the state. Providing additional specialized extension services to off-campus constituents are the Center for Governmental Services, Center for Arts and Humanities, Small Business Development Center, Center on Aging, Center for Executive Development, and the Alabama Incubator Center, among others.

The Auburn University Hotel and Conference Center is a focal point of the University's commitment to serving the life-long learning needs of Alabama citizens.

Instruction

Instruction of students is the primary mission of the University. In the classroom, the laboratory, the library, Auburn University's goals are to assist students to reach their full potential, instilling respect for intellectual inquiry and understanding of cultural tradition; and to equip them with the knowledge and skills which they will need in a demanding and increasingly complex society.

The University faculty offers specialized instruction leading to the bachelor's degree in 138 fields in 64 departments, the master's degree in 60 fields, and the doctorate in 38 areas. The faculty and curricula are organized into 13 colleges and schools: the College of Agriculture, the School of Architecture, the College of Business, the College of Education, the College of Engineering, the School of Forestry, the School of Human Sciences, the College of Liberal Arts, the School of Nursing, the School of Pharmacy, the College of Sciences and Mathematics, the College of Veterinary Medicine, and the Graduate School.

Military instruction is available through the Reserve Officers Training Corps (ROTC) in Army, Naval, and Air Science basic and advanced programs.

Liberal Education Program

The University's instructional program for undergraduates specifies that students complete a component of general studies in addition to the requirements of their College, School or departmental major: this general work covers a foundation year of courses in English composition; world history, art history, or literature; natural science; mathematics or philosophy; and physical education; and is to be taken during the lower-division years, primarily at the freshman level. A certain number of hours must also be completed in elective courses lying outside students' major area, these to be taken, in part at least, during the upper-division years.

The goals of this "experience in breadth" are to some extent intangible: the development in students of the values of tolerance, intellectual honesty, and a capacity for reflective judgment. More specifically, it is hoped that students will acquire also an ability to order their thoughts in a clearly expressed and reasoned manner; attain a grasp of the scientific method and discipline; develop some understanding of their culture and its backgrounds; and come to perceive the vital issues of our common life as citizens in a complex and changing world.

The minimal University requirements for all students are listed below; however, they should consult the appropriate curriculum model in their College or School for complete requirements.

Requirement	Hours	Option
English Composition EH 101-102-103 (3-3-3) or EH 105-106 (3-3-[3])	9	
History or Literature	9	World History 101-102-103 (3-3-3) or Technology & Civilization 121-122-123 (3-3-3) or World Literature (EH) 260-261-262 (3-3-3) or Art History 171-172-173 (3-3-3)
Natural Science	minimum of 10	Biology 101-102-103 (5-5-5) 105-106 (5-5) 105-107 (5-5) Chemistry 103-104 (5-5) 101-102-104 (2-3-5) Geology 101 (5), 102 (5), 103 (5), 110 (5), Physics 205-206-207 (4-4-4), 220, 221, 222 (4-4-4) Physical Science 100-101 (5-5)
Mathematics or Philosophy	minimum of 5	Mathematics 100 (5), 140-161 (5-5), 151-161 (5-5) 160-161 (5-5) Philosophy 111 (3), 202 (5), 210 (3), 211-212 (3-3), 214 (3), 216 (3)
Electives or Area Requirements	minimum of 20	Additional hours of liberal education studies will consist of coursework in two broad academic areas other than that in which the student's own major field lies (Humanities and Fine Arts, Social Sciences, Mathematics and Natural Science), with no less than one course in each area.

Freshman English Composition Requirements

Credit in freshman English composition earned at another institution may be allowed on transfer as follows, except that no grade less than C will be accepted.

If transfer students have been exempted from freshman English composition at another institution and have had no subsequent coursework in freshman composition, they must still complete Auburn's nine-hour requirement. However, they may take the English Department's Advanced Standing examination for possible exemption with credit for part or all of that requirement. This exam is normally administered on the first day of final registration just before each quarter; check with the English Department for the date, place, and time.

If transfer students have been exempted with credit from part of a freshman composition sequence at another institution and have earned a grade of C in subsequent coursework in composition there, they will be allowed credit for the coursework but (depending on the number of hours still needed) will be required to complete EH 103 or EH 102 and 103. In other words, students must complete the freshman English requirement by taking the last course or last two courses in the Auburn sequence. This does not constitute course duplication.

If transfer students have been exempted with credit from part of a composition sequence at another institution and earned an A or B in subsequent coursework there, then both the exemption credit and the course credit will be allowed. If transfer students have been exempted without credit and have earned an A or B in subsequent coursework there, then the course credit will be allowed and, in addition, they will be awarded sufficient Advanced Standing credit to fulfill Auburn's freshman English requirement. This credit will be awarded through the Registrar's Office.

If at another institution transfer students have made a grade of D in an earlier course in freshman English and a C or better in a subsequent course, they are required to take the last course or the last two courses in the Auburn sequence. For example, students who at another institution made a D in EH 101 and a C in EH 102 will be required at Auburn to take either EH 103 or EH 102 and 103, depending on the number of hours they need to complete Auburn's nine-hour requirement. This does not constitute course duplication.

If the transfer students have fewer than three quarter hours of credit in freshman English composition, no credit is allowed. If they have three quarter hours credit in the first course of an English composition sequence, they must complete both EH 102 and EH 103.

If transfer students have four quarter hours of credit in the first course of a three-course sequence, they must complete EH 102 and 103.

If transfer students have either four or five quarter hours of credit in the first course of a two-course sequence, they must complete EH 103.

If transfer students have three semester hours of credit in the first course of a two-course sequence, they must complete EH 103.

If transfer students have earned eight or more quarter hours and have met the first year English composition requirement of the other institution, credit may be allowed for EH 101-102-103, provided the minimum of eight hours involves no duplication. A total of 12 hours may be accepted toward the graduation requirement when the 12 hours of work represents a continuous course sequence at one school.

No student failing a freshman English composition course at Auburn will be permitted to transfer credit from another school to offset that F, but must repeat the course in residence at Auburn (Auburn campus). Furthermore, the student must take all subsequent required freshman composition courses at Auburn (Auburn campus).

Students entering an undergraduate school at Auburn University after receiving a bachelor's degree from another accredited college or university are exempted from meeting these regulations. Persons who have questions about placement or credit which are not covered in this statement should talk to the Director of Freshman English (205-826-4620.)

All transfer students should clear their freshman English composition credits with the Registrar as soon as possible after enrolling at Auburn University.

History—Literature Requirements

One of the purposes of the University's Liberal Education Program is to give students an understanding of their culture and its backgrounds. Course sequences designed especially for this purpose are those in world history, world literature, technology and civilization, and art history. Students must earn nine hours of credit in one of these sequences.

Credit in history or literature earned at another institution may be allowed on transfer as shown below in meeting this particular requirement. The student's dean may require a C grade for a course to transfer.

1. If transfer students have three or four quarter hours of credit in the first course of a three course sequence in history or literature, they must complete HY 102 and 103, HY 122 and 123, AT 172 and 173, or EH 261 and 262.
2. If transfer students have four or five quarter hours of credit in the first course of a two course sequence, they must complete HY 103, HY 123, AT 173, or EH 262.
3. If transfer students have earned eight or more quarter hours in a history or literature area and have completed the standard history or literature requirement of the other institution, they may be excused from this particular requirement in the Liberal Education Program.
4. If students enter an undergraduate school at Auburn after receiving bachelors' degrees from other accredited universities, they may be exempted from the history-literature requirements unless their curriculum majors or minors specify one of the four sequences described in this section.

The Honors Program

Entering freshmen with extraordinarily high academic aptitudes are eligible for consideration for admission into the University Honors Program. Basic requirements are (1) an ACT

composite of 29 or higher or an SAT total of 1250 or higher and (2) a high school grade point average of 3.4 or higher. Students may be considered on the basis of the separate sections of the ACT or SAT and an exceptional high school record. The University Honors Program includes students in the College of Liberal Arts, College of Engineering, School of Architecture, College of Business, College of Education, School of Human Sciences, School of Nursing, and College of Agriculture, College of Sciences and Mathematics and School of Forestry.

The Honors Program provides a group of honors courses in the freshman and sophomore years, individual learning opportunities in the place of some conventional course work in the junior and senior years, the writing of an honors thesis, and the possibility of accelerated entry into work on a master's degree. Successful completion of the Honors Program with a minimum overall grade point average of 3.4 is recognized by notation on the student's diploma and permanent record.

Libraries

The Ralph Brown Draughon Library is the main library; branches are maintained in the School of Architecture, School of Veterinary Medicine, and on the first floor of Haley Center.

Current holdings include over 1,518,000 bound volumes and 2,212,000 items in microformat. The library is a depository for government documents and lists among its serial subscriptions more than 12,900 periodicals and 150 newspapers. Special collections include an Alabama Collection, 117,200 maps and other special materials.

Library staff members offer assistance in the location and use of library materials at the General Information and Humanities Desk, and at desks in the Social Sciences Department, Science and Technology Department, Special Collections, and the Microforms and Government Documents Department. Desks are also maintained in the three branch libraries: Veterinary Medicine, Architecture, and Haley Center.

A convenient open-shelf arrangement of the main collection makes material readily accessible. Comfortable, well-lighted study areas are available, including carrels which graduate students and faculty may reserve.

Archives

The University Archives was established in 1964. Its holdings include over 800 archival collections related to Auburn University and Alabama history; 1400 oral history and recorded sound tapes; approximately 100,000 photographs; and 900 reels of microfilm. The University Archives also administers the University's records management and micrographics programs.

Division of University Computing

University-wide academic and administrative computing services are provided by the Division of University Computing. All requests for use of the Division's mainframe, minicomputer and microcomputer facilities are initiated through heads of academic and administrative departments. Request forms are available in 144 Parker Hall. The Division has four component units: Academic Computing Services, Administrative Computing Services, Technical Support and Operational Support.

Academic Computing Services is the liaison to the academic community and supports research and instructional applications on the academic mainframe, the VAX minicomputer facility and the microcomputer labs. User services, including consulting, training, documentation, technical support and a newsletter, are provided to faculty and students. Software is available on the academic computers for statistics, text processing, graphics, simulation, spreadsheets, data management, and programming. A number of microcomputer software products are available for university use through site licenses and volume discount agreements.

Administrative Computing Services is the liaison to the administrative community and provides systems design, programming, data reporting, user assistance and training in support of administrative applications. Software is available on the administrative mainframe for student, financial, facilities and personnel information, as well as the library card catalog and office automation systems.

Technical Support is responsible for the systems software on the host computers. This includes the operating systems, security, communications, and data base management systems.

Operational Support operates the mainframe computers. An IBM 3083 and several VAXes support academic computing, and administrative processing is done on an IBM 3081. Remote sites, both interactive and batch, are provided in several locations around campus. In addition, all production jobs are processed in this unit.

The Division of University Computing is a service organization, and does not conduct an academic program. Inquiries concerning computer curriculums should be directed to the Dean of Engineering or the Dean of Business; information pertaining to these programs is contained elsewhere in this catalog.

Center for Governmental Services

The Center for Governmental Services (CGS) complements the instructional and research programs of Auburn University with the capability to respond positively to public sector needs. Organized to provide coordination and leadership, CGS helps faculty and departments to develop, conduct and administer general extension activities and public policy research. This public service is in the area of county, state, and municipal government finance, personnel, energy, evaluation, and technical assistance. Training activities in budgeting, communication, administration, and management include programs for county government officials, housing authority personnel, municipal personnel, hospital administrators, various professional associations, and local, state, and federal agencies. Through practical and efficient research, training and evaluation services, CGS connects the University and the public sector by contributing to the base of knowledge necessary for informed public policy decision-making.

Auburn University Aviation

Auburn University Aviation was established in 1942 as a department of the School of Engineering. Operating as a division of the Aerospace Engineering Department, AU Aviation was designed to offer flight education for students of the University, for the Armed Forces, and for the general public; and to serve the citizens of Alabama and the Southern region by providing other needed aviation services. The department cooperates fully with the Federal Aviation Administration and other organizations in conducting special aviation research and education programs. *The department is under the direction of the President's Office, reporting to the Executive Vice President, Auburn University.*

AU Aviation serves as a laboratory of practical instruction for students enrolled in the curricula of Aviation Management and Aerospace Engineering as well as other University curricula. Flight courses offered lead to FAA private, commercial, multi-engine, instrument, flight instructor, and airline transport certificates and ratings. *Flight courses are offered to both University students and the general public.*

The University owns and operates the 422-acre Auburn-Opelika Robert G. Pitts Airport. Operated as a State of Alabama public facility, the Airport is conveniently located within three miles of the University campus, with two lighted, 4000-foot, paved runways; a two-story administration building; two large hangars, two five-unit T-hangars, and one five-unit Planeport. *The department currently operates nine single and multi-engine aircraft, plus a flight simulator.*

In addition to flight training, other services such as fuel, maintenance and airplane storage, and aircrew amenities are provided at the airport. AU Aviation also provides air transportation for University faculty and staff on official University business.

The department is fully certified by the FAA as an Air Agency with examining authority for private, commercial, and instrument courses, and multi-engine courses. The department through FAA authorization is able to conduct FAA flight and written examinations.

Revenues

Auburn University receives financial support from student fees, state and federal appropriations, endowments, income from clinical services, sales, gifts, grants, contracts, and other sources. The largest single source of income is state appropriations.

Student Affairs

THE DIVISION OF STUDENT AFFAIRS, under the direction of the Vice President, administers services and programs for students, faculty, staff, and alumni. Areas of involvement of this division include Admissions, Student Development, Financial Aid, Recreational Services, Registrar, Student Health Services, Student Activities, and Student Information Services.

Admissions

Auburn University is an equal opportunity educational institution and, as such, does not discriminate in its admissions policy on the basis of race, color, sex, creed, handicap, age or national origin. Preference is given to the admission of Alabama residents at the undergraduate level; in considering applications to professional schools or programs with restrictive admissions policies, the length of residency in the state will be a factor.

Applications from out-of-state residents will be accepted for all curricula; however, the number of nonresidents who are admitted will be determined by the availability of facilities and faculty.

Application to any undergraduate school or curriculum of the University must be made to the Admissions Office, Auburn University, Alabama 36849-5145. Application forms and instructions can be obtained from the Admissions Office. Application to the Graduate School or the School of Veterinary Medicine must be made to those schools.

Individuals may apply for entrance to any quarter of a calendar year as early as September 1 of the preceding year. Applicants to Veterinary Medicine and Pharmacy will be admitted in the Fall Quarter only. Because of the large number of applications, credentials should be submitted at the earliest possible time. In all cases, complete credentials along with the physical examination report must be filed at least three weeks before the quarter's opening. The University reserves the right to establish earlier deadlines should circumstances warrant such action.

A \$15 processing fee must accompany all admission applications and is neither refundable nor applicable to other fees. Responses on the application forms and on related materials must be complete and accurate; entrance may be denied or registration cancelled as a result of false or misleading statements.

Applicants may receive provisional acceptance after they submit the application form and current academic documents. However, they must complete and return a medical examination report at least three weeks before the quarter opens. The University provides the medical report form; it also may require additional medical examinations if such appear advisable, and it may refuse admission to any individuals whose health records indicate that their health or the University community might be adversely affected by their attendance.

Each applicant must furnish satisfactory evidence of good character. The University may deny admission to those whose presence is deemed detrimental to the institution or its students.

Admission of Freshmen

Enrollment limitations for freshmen have been established by curricula and schools, in proportion to available faculty and facilities. Favorable consideration for admission will be given to accredited secondary school graduates whose college ability test scores and high school grades give promise of success in college courses.

All secondary school students planning to apply for admission to Auburn should emphasize the following high school courses: English, mathematics, social studies, sciences, and foreign languages.

High school curriculum requirements — effective for freshmen entering Fall Quarter, 1990.

English		4 years
Mathematics		3 years
Algebra I and Algebra II	(2 years)	
Geometry, Trigonometry, Calculus, or Analysis	(1 year)	
Science		2 years
Biology	(1 year)	
Physical Science	(1 year)	
Social Studies		3 years
Recommended:	1 additional Science	
	1 additional Social Studies	
	1 Foreign Language	

Applicants are required to present scores from either the American College Test (ACT) or the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board. High school students may secure application forms from their principals or counselors. Scores on these tests are used as a partial basis for admission, for placement in English, chemistry, and mathematics, and for awarding University scholarships and loans.

Prospective freshmen who take the ACT and SAT, list Auburn as a score recipient and meet freshman entrance requirements will be mailed a pre-printed application completed from information supplied to the testing service by the student.

Applicants whose native language is not English may be required to demonstrate proficiency in English.

Applicants of mature age who are not high school graduates may be considered for admission if their educational attainments — through testing — are shown to be equivalent to those of a high school graduate. The tests used include the USAFI General Educational Development Test, the American College Test and/or other tests recommended by the Admissions Committee. Applicants from nonaccredited high schools will be considered on an individual basis by the Committee.

Early Admission — Students of high academic promise may be admitted directly from the eleventh grade without a diploma. Basic requirements for early admission include:

1. Proper personal qualifications.
2. Superior competence and preparation, evidenced by the high school record and college aptitude test scores (ACT, SAT or other tests prescribed by the University Admissions Committee).
3. A letter from the high school principal assessing the applicant's emotional and social maturity, and readiness for college work.

Additional information on procedure is available at the Admissions Office.

Advanced Standing — Students with superior preparation may be placed in advanced programs suited to their ability and academic background. Individuals with special competence may qualify for advanced placement or credit on the basis of high school grades, scores on college ability or achievement tests, the College Level Examination Program (CLEP) tests, proficiency tests, and military courses. See Advanced Standing.

Admission of Transfer Students

A satisfactory citizenship record, an minimum 2.5 cumulative grade-point average on a 4.0 scale on all college work attempted, and eligibility to re-enter the institution last attended are required for transfer admission. Transfer applicants to Architecture, Engineering, Interior Design, Landscape Architecture, and Building Science must meet higher admission standards. The required number of hours is dependent upon eligibility to enroll at Auburn University as a freshman. Entrance examinations may be required of applicants transferring from colleges with which the University has had little or no experience.

Applicants who were not eligible for admission to the University when they graduated from high school must present a minimum of 48 quarter hours or 32 semester hours of college credit with a 2.5 cumulative average. In addition, they must have earned a 2.5 average in at least 30 credit hours of standard academic courses required by Auburn's Liberal Education Program (Core Curriculum). These credit hours achieved must include at least three (3) quarter hours in the following areas.

- (1) English (college-level composition or literature)
- (2) History
- (3) Mathematics
- (4) Natural Science with a laboratory

The College of Engineering limits enrollment of students to its various curricula. In addition to the minimal criteria, students must be recommended by the Curriculum Admissions Committee. The criteria include an overall average of 2.8 and the completion of the first mathematics course listed in the chosen curriculum with a grade of **C** or better.

Transfer Credit — The amount of transfer credit and advanced standing allowed will be determined by the appropriate dean and the registrar. The dean will determine acceptance of **D** grades; credit in freshman English is allowed only on grades of **C** or better. The maximum credit allowed for work completed in a junior college will not exceed the number of hours required in the first two years of the student's curriculum at Auburn.

Students transferring from unaccredited institutions or programs may be granted provisional credit. When such credit is allowed, the final amount of credit will be determined upon completion by the student of one year of course work at Auburn University. If a **C** average is not achieved, the amount of credit will be reduced in proportion to the number of hours in which the student fails to earn a **C** average or better.

Transfer Within the System

Auburn University maintains a campus at Montgomery, Alabama. An undergraduate enrolled at either of Auburn's campuses who wishes to transfer to the other campus will be considered as a transfer student from any other accredited college. Because there is a slight difference between some curricula and courses at the two institutions, transfer credit and advanced standing will be determined by the academic unit and the registrar at the campus to which the student is moving.

Admission of Transient Students

A student in good standing in an accredited college may be admitted to the University as a transient student when faculty and facilities are available.

To be eligible for consideration, an applicant must submit an application, an acceptable medical report and a letter of good standing bearing the signature of the dean or registrar of the college in which the applicant is currently enrolled.

Permission to enroll is granted for one quarter only; a transient student who wishes to re-enroll must submit a new application. Transient status does not constitute admission or matriculation as a degree candidate. The transient is, however, subject to the same fees and regulations as a regular student except for the continuation-in-residence requirements.

Admission of Unclassified Students

Admission to most undergraduate programs as an Unclassified Student may be granted on the basis of the bachelor's degree from an accredited college. Unclassified Students in Engineering must also meet the grade-point-average specified for Engineering transfer students. Unclassified students must submit the same admissions credentials as transfer applicants.

Admission of Special Students

Persons who do not meet general admission requirements for freshmen, but who are judged to have potential for success may be approved for special admission. An individual interested in admission as a special student should contact the Admissions Office.

Admission of International Students

The University welcomes admission inquiries from international students. Because of limited facilities, however, only those students who are academically strong will be given serious consideration for admission. Also, the international student should be proficient in English. In all cases, English proficiency is determined by satisfactory results on the Test of English as a Foreign Language (TOEFL), offered by the Educational Testing Service, Box 899, Princeton, N.J., 08540, U.S.A. The student must submit satisfactory results on the Scholastic Aptitude Test of the College Entrance Examination Board, also offered by the Educational Testing Service.

International students first should send all of their academic credentials to the Admissions Office for evaluation. If they appear to be qualified, and show promise of success in their chosen fields of study, they will then be asked to make formal application. The application must be accompanied by a recent photograph and an application fee of \$15 (not refundable). If the applicants present satisfactory academic credentials, test results, and evidence that they have sufficient funds to meet their college expenses (there is no financial assistance for undergraduate international students), they will then be sent an acceptance and the form I-20, the authorization for a student visa. All international students are required to subscribe to Plan II of the student insurance plan or provide evidence of equivalent coverage. Information about student insurance is available at the Drake Student Health Center. For further information, prospective students should write to the Admissions Office, Auburn University, Alabama 36849-5145, U.S.A.

Admission of Auditors

When faculty and facilities are available, an individual who does not seek admission for course credit may audit a lecture course or the lecture portion of a course upon approval by the Admissions Office, the dean, and the head of the department involved. A formal application must be filed, but the \$15 application fee and the physical examination report are not required.

Admission to Graduate Standing

Admission to graduate standing is granted only by the University Graduate School. A \$15 application fee is required. A bachelor's degree or equivalent from an accredited college or university and submission of satisfactory scores on the Aptitude Test of the Graduate Record Examination are required for Graduate School admission. Applicants for admission to doctoral programs must submit Advanced Test scores also. Certain departments require applicants to master's degree programs to take the Advanced Test.

The undergraduate preparation of each applicant must also satisfy the requirements of a screening committee of the school or department in which the student plans to major. A student in good standing in a recognized graduate school who wishes to enroll in summer session, off-campus workshop, or short session, and who plans to return to his former college, may be admitted as a graduate transient. For further information, see the section on the Graduate School and also the Graduate School Bulletin.

Readmission

Students who have previously attended Auburn and who wish to re-enter must secure a registration permit from the Registrar's Office. Former students who have attended another college for at least one quarter or semester must be eligible to re-enter that institution, if they desire to return to Auburn. Students who attended another institution for more than one quarter must have earned an overall C average or better since last attending Auburn to be eligible to re-enter Auburn. Two transcripts from the institution attended must be supplied to the Registrar.

Pre-College Counseling

In order to help entering freshmen and transfer students choose fields of study, and to adjust to their first quarter at the University, Auburn provides pre-college counseling.

Freshmen entering Fall Quarter attend counseling sessions on campus during the summer prior to entrance. In these sessions, students meet faculty members, administrators, and student leaders, and plan with their advisers a schedule of their first quarter of college work.

Freshmen entering the University any quarter other than Fall Quarter are usually required to report to campus one day early for counseling.

Transfer students may meet with advisers during the regular pre-registration period for the quarter in which they plan to enroll. Transfers will plan their schedules after their transcripts have been evaluated. A convocation for all new students is held on the first day of registration prior to the beginning of classes.

Policy On Accommodation For Handicapped

It is the policy of Auburn University to provide program accessibility and reasonable accommodation for persons defined as handicapped in Section 504 of the Rehabilitation Act of 1973. Specifically, the Office of Special Programs provides evaluation of individual needs and appropriate support for academic programs of persons identified as handicapped.

Handicapped students who desire information about accessibility or service to students should contact the Office of Special Programs, 345 Foy Union, or telephone (205) 826-2353.

Alabama and Non-Alabama Student Policy

For the purpose of assessing fees, applicants shall be classified as Alabama or non-Alabama students. Non-Alabama students are required to pay a tuition fee.

An Alabama student is a person who shall be a citizen of the United States or a resident alien and who shall have resided and had habitation, home, and permanent abode in the State of Alabama for at least 12 months immediately preceding current registration. In applying this regulation, "applicant" shall mean a person applying for admission to the institution if applicant is married or 19 years of age, or, otherwise, it shall mean parents, parent or legal guardian of his or her person. If the parents are divorced residence will be determined by the residency of the parent to whom the court has granted custody. A student shall be classified as an Alabama student when parent(s) or legal guardian establishes domicile within the state and is employed full-time in a permanent position in the state.

In the determining of an Alabama student for purposes of assessing fees, the burden of proof is on the applicant. An applicant can change status from non-Alabama to Alabama

student only by actually and physically coming into the state for the required period with the intention of residing within the state.

A non-Alabama student may apply in writing for reclassification prior to any subsequent registration. To qualify for reclassification as an Alabama student, the applicant (1) shall present evidence of having resided in Alabama for 12 consecutive months preceding request for reclassification, (2) shall submit evidence that subject has met the usual and expected obligations of an Alabama citizen, and (3) shall file a declaration of intent to reside in Alabama. An alien shall have resided in Alabama for 12 months and must present U.S. Immigration and Naturalization certification that he or she is a resident alien. If the application is supported by evidence satisfactory to the University that the student then qualifies as an Alabama student, the classification may be changed for future registrations.

Members of the Armed Services and their dependents stationed in Alabama, unless specifically for civilian educational purposes, will be granted resident status. Dependents of members of the Armed Services stationed outside Alabama will be granted resident status if the parent or guardian in the Armed Services has an Alabama Home of Record. Furthermore, members of the Armed Services with an Alabama Home of Record who enroll in the University while on active duty or within a one-year period after leaving active duty will be granted resident status. Documentation is required and the Alabama Home of Record must be attested to by military authority for a minimum period of one year before the entry of the student.

The Registrar shall have the responsibility for determining whether a student shall be classified as an Alabama or non-Alabama student. The decision of the Registrar shall be subject to review by the President or his designated representative upon written request of the applicant.

Fees and Charges

Auburn University's fees have remained somewhat lower than those charged by similar institutions in the Southeast and in other sections of the country. As institutional costs have risen, small increases in fees have been authorized from time to time by the Board of Trustees. Every effort is made, however, to hold fees and charges at a minimum.

The following fees and charges are in effect at this time. However, since the catalog must be published well in advance of the next school year, it is not always possible to anticipate changes. **Thus the fee schedule may have to be revised. Every effort will be made to publicize changes as far in advance as possible.**

Payment of Fees and Charges — Students are expected to meet all financial obligations when they fall due. The University reserves the right to deny admission, disenroll or withhold transcripts of any student who fails to meet promptly his financial obligations to the University. It is each student's responsibility to be informed of all registration and fee payment dates, deadlines, and other requirements by referring to the official calendar of events in the catalog, announcements printed in the *Plainsman*, or disseminated by other means from time to time. Where necessary, students should inform their parents of the deadline dates, and the necessity of meeting them. (The University is currently in the process of developing and implementing a centralized billing system to be effective by Fall Quarter 1989. Implementation of this system will allow students to pay most student charges by mail. Payment due dates and deadlines have not been finalized as of publication date and are therefore not included in the official calendar contained in this catalog. Please refer to separately distributed information regarding the billing system or contact: The Office of Bursar, Quad Center, Auburn University, AL 36849.)

Checks — Checks given in payment of fees and charges are accepted subject to final collection. If the bank on which the check is drawn does not honor the demand for payment and returns the check unpaid, the student will pay the returned check fee of \$10 and applicable late payment penalty fee. If payment is not cleared promptly, the student's registration may be cancelled. The University has the right but not the obligation to redeposit any insufficient check without notice to the student or maker.

Veterans — Veterans enrolled under the federal GI Bills P.L. 358 and P.L. 634 receive their allowances directly from the Government and are responsible for paying their fees and charges on the same basis as other students. This does not apply to P.L. 894 or P.L. 815.

Any collection costs or charges with all attorneys fees necessary for the collection of any debt to the University will be charged to and paid by the debtor. Questions about charges or refunds should be addressed to the Director of the Office of the Bursar.

Foreign Students-Under Contract — For those foreign students who come to the University under a contractual arrangement that requires special administrative and programming arrangements beyond those of the regular academic program of the University, a special administration/management/program fee will be negotiated.

Basic Quarterly Charges (Effective Fall Quarter 1989)

Students should be prepared to complete registration by payment of fees and charges, upon notice, two to three weeks before the beginning of the quarter. Implementation of a new billing system is currently in process and, as of publication date, payment due dates and deadlines have not been finalized. Please refer to separately distributed information regarding the billing system or contact: The Office of Bursar, Quad Center, Auburn University, AL 36849.)

A. Graduate & Undergraduate	Ala. Students	Non-Ala. Students*
1. University Fee - 10 to 15		
credit hours (all except Vet. Med.) (a.)	492.00	1,476.00
2. University Fee — Vet. Med. — 10 to 15 credit hours (a.)	625.00	1,875.00**
3. Additional Fee for each credit hour over 15 on 1 and 2 above	16.00	48.00
4. Part-time Registration Fee (Less than 10 credit hours) (b.)	85.00	255.00
5. Part-time Credit Hour Fee (Less than 10 credit hours) (except Vet. Med.) (b.)	40.00	120.00
6. Part-time Credit Hour Fee — Vet. Med. (Less than 10 credit hours) (b.)	54.00	162.00
7. Auditing Fee (c.)	40.00	120.00
8. Clearing for Graduation (d.)	85.00	255.00
9. Doctor of Pharmacy Fee (e.)	110.00	110.00
10. Music Fee (per applied course) (f.)	50.00	50.00
11. Computer Literacy (U 135)	15.00	15.00
12. Field Laboratory Courses — Off Campus Program (g.)		
(a.) Service Fee	85.00	255.00
(b.) Additional Fee Per Credit Hour	40.00	120.00
13. Correspondence Study Course Fee (h.)		
a. Service Fee	11.00	11.00
b. Additional Fee Per Credit Hour	26.00	26.00

*Non-Alabama fees shall not apply to Graduate Teaching Assistants, Graduate Research Assistants and Graduate Assistants, on a one-fourth time or greater appointment in the University. These shall pay fees as Alabama students when furnishing appropriate certification at the time of payment.

**Only \$625 for SREB students.

(a.) The University Fee is used to meet part of the cost of instruction, physical training and development, laboratory materials and supplies for student's use, maintenance, operation, and expansion of the physical plant, Library, Student Health Services and Student Activities.

The Student Activities portion of the fee supports such activities on campus as intercollegiate athletics, exhibits, GLOMERATA, intramural sports, PLAINSMAN, religious life, social affairs, student government, student union activities and operations, TIGER CUB, and WEGL Radio Station. This fee includes 25 cents held in reserve to cover unnecessary

damage to University property by students.

- (b.) Students registering for fewer than 10 credit hours will pay the Part-Time Registration Fee plus the Credit Hour Fee for each credit hour. (Students who register for 10 or more hours will pay the University Fee.) The Part-Time Registration Fee is remitted to full-time faculty and staff taking no more than five credit hours. All students except faculty and staff are eligible to participate in Student Health Services and Student Activities.
- (c.) Any student who pays less than full fees must pay this fee for auditing a course. (Not charged to faculty and staff.)
- (d.) A student who is a candidate for a degree in a quarter in which no credit work is taken is required to register in such quarter as a prerequisite to graduation. (For members of the faculty and staff the charge shall be reduced to \$5.00.) Graduation fee is to be paid in addition to this charge.
- (e.) Extra fee per quarter — Clinical Pharmacy.
- (f.) This additional music fee to be paid at the time of registering for each Performance Course of individual instruction. Instruction is available in one hour or two half-hour lessons per week.
- (g.) Students registering for off-campus courses (Field Laboratory Courses) will pay the Service Fee plus the additional fee per credit hour.
- (h.) Students registering for Correspondence Study Courses will pay the Service Fee plus the additional fee per credit hour. Special Lab Fees may be associated with certain courses.

Other Fees & Charges

Fee for the Late Registration or Late Payment

All students, regardless of classification, must clear fees and tuition by the deadlines set by the University, or pay late registration or late payment fees. Because the University is currently in the process of developing and implementing a centralized billing system to be effective by Fall Quarter 1989, the schedule for these charges has not yet been finalized as of publication date. Please refer to separately distributed information regarding the billing system or contact: The Office of Bursar, Quad Center, Auburn University, AL 36849.

Reinstatement Re-enrollment Fee (After Disenrollment)	60.00
Achievement Certificate Fee	10.00
Application Fee	15.00

The application fee must accompany all applications for admission. Not refundable nor applicable to registration fees. (See section on Admissions.) An application fee must accompany the application for housing and is not refundable or applicable to housing fees. (See section on housing.)

15.00

Change in Course fee

10.00

Charge is made in cases where student is not required or advised by the University to change, but has the Dean's permission to do so after Schedule Adjustment period. This fee is not refundable.

Change in Curriculum Fee (if change made after classes begin)

10.00

Chemistry Lab Fee (not refundable after 10th class day)

20.00

Duplicate Diploma Fee

15.00

Doctoral Dissertation Microfilming Fee

45.00

Equivalency Examination Fee (GED) (each)

20.00

Graduate Thesis and Dissertation Binding Fee (per copy)

7.00

Three to five copies usually required.

Graduation Fee (each degree)

15.00

Payable at beginning of the quarter in which the student expects to receive a degree. Deadline — two weeks before Graduation (transferable to next quarter or refundable if student fails to qualify).

Cap and Gown Rental Fees (for Graduation Exercises)

(includes retaining of tassel)

Bachelors — cap and gown

11.95

Masters — cap, gown, and hood

19.25

Doctorate — cap, gown, and hood

20.95

Internships

Agriculture AEC 399, ADS 495, AY 390, ENT 491, FAA 315, HF 330, PH 402

Business AC 400, EC 400, FI 400, MN 400, MT 400

Consumer Affairs CA 335

Criminal Justice LE 464

Foreign Language International Trade FL 499

Journalism JM 425

Political Science PO 450

Speech Communication SC 439, CD 658, CD 668

Zoology ZY 490

Fees will be one-half the full University Fee and one-half of the non-Alabama student fee, if applicable. Total course load not to exceed 9 credit hours.

Rent for Single Student Housing, per quarter (see housing) 320.00 to 485.00

Rent for Caroline Draughon Apts., per month (see housing) 235.00 to 325.00

Meal Plans (See section on Food Services under Student

Services and Programs.)

Air Force ROTC Uniform and Equipment Deposit 50.00

All students, both Basic and Advanced, are required to deposit the sum of \$50 with the University Bursar, prior to enrollment in AFROTC. The deposit is refunded to the student on completion of the program or withdrawal therefrom and the return of the uniform and other supplies.

Registration fees billed home,

To parents, Trust Funds, companies, or other sponsors 5.00

Charge for returned check 10.00

Notice: ALL CHECKS ARE ACCEPTED SUBJECT TO COLLECTION

Special Service Fees

Cooperative Education Program 15.00

Internship Fee-Veterinary Medicine 15.00

Transcript Fee 3.00

Registration Fee Cancellations or Refunds

Students officially resigning prior to the start of a quarter will not be held liable for fees (other than non-refundable fees). Students resigning during the first 10 days of class are excused their regular fees but are liable for the \$100 resignation fee. In addition, any student using the University Health Service will be liable for the \$20 Health Services Fee. In situations where the effective date of the resignation precedes the date the resignation form was processed by more than 10 class days, the resignation form must be accompanied by a letter from the student explaining the reason for the delayed request. In such cases, the final determination of the amount, if any, of refund or liability reduction will be made by the Office of Bursar.

The liability for fees will not be excused for resignations effective after the 10th class day except in cases of resignation caused by personal illness (physician's statement required) or call into military service (copy of activation orders required) in which cases a pro-rata reduction in liability will be made. Students having made prior payment will be refunded the amount paid less their liability after the resignation. Students suspended for disciplinary reasons are not eligible for refunds or reductions in liability. Resigning students receiving refunds will first have their refunds applied to any outstanding obligations and to any scholarship, grant, or loan which they had received for the quarter.

Students reducing course loads on or prior to the 10th day of classes may be eligible for a partial refund or reduction in liability of tuition and fees. To be eligible, the completed schedule adjustment form must be left for final approval with the applicable academic dean's office on or before the 10th day of classes. In such cases, fees will be reassessed based on the adjusted schedule.

Academic Regulations

Registration and Scheduling

Every student who makes use of the instructional staff and facilities of the University must register and pay fees. This rule also applies to students who are clearing incomplete grades, clearing for graduation, or working on graduate theses. The University Calendar on pages

6 and 7 lists the dates for registration, schedule adjustment, and final registration. The student's dean authorizes and approves the subjects for which the student registers, as well as any changes or adjustments in his schedule. Courses should be scheduled in sequence as they appear in the curriculum model.

Students are urged to register during the computer-assisted registration held in the quarter preceding the term for which they are registering. A currently enrolled undergraduate who fails to do so is charged a late fee. Schedule distribution and fee payment are accomplished by mail prior to the beginning of a quarter for students who computer register. A final registration is held one to two days before the first day of classes.

When registering, the student is responsible for observing the prerequisites or corequisites of courses. Any waiver of these requirements must be approved by the instructor and/or his department head. Also, waiver of the junior standing prerequisite for courses that may be taken for graduate credit must have the Graduate School dean's approval.

Late registration must be authorized by the student's dean, and a late fee will be charged. A student's class load may be reduced by the dean. No student will be registered after the tenth day of classes without the approval of the Vice President for Academic Affairs.

Course credit completed at another college or university while the student is concurrently enrolled at Auburn University will not be counted toward his degree without prior permission from the dean.

Registration and Readmission Permits

Entering freshmen and first-quarter transfer students obtain permits to register from the Admissions Office. Previously enrolled undergraduates secure their permits from the Office of the Registrar; graduate students receive theirs from the Graduate School.

A student seeking readmission who has attended another college since being enrolled at Auburn University must (1) be eligible to re-enter the last institution attended and (2) have a C average overall on course work attempted at other colleges attended two or more terms. Two official transcripts from each institution attended must be furnished to the Registrar's Office.

Change of Major or Curriculum

Students must have their dean's approval to change to another major within the same College or School. To change Colleges or Schools within the University, a permit from the Registrar's Office is required.

Course Load

The maximum load for students in undergraduate curricula is 19 quarter hours. A normal load is 15-19 hours per quarter. With their dean's approval, students may schedule less than a normal load.

The maximum load may be exceeded under the following circumstances:

1. The academic dean may approve up to 20 hours as a convenient load.

2. On approval of their dean, students may schedule overloads not to exceed 23 hours if, during their last residence quarter at Auburn University in which they carried 15 or more hours, they passed all work attempted and earned a grade point average of 2.5 or higher. Students who have scheduled fewer than 15 hours during an intervening quarter (or quarters) will retain the overload privilege if all work carried was passed with a minimum grade-point average of 2.5 in each intervening quarter. In special cases the dean may make exceptions to the 2.5 requirement, by written notice to the Registrar.

3. On approval of their dean, graduating seniors who are ineligible to carry an overload may schedule a maximum of 23 hours if the overload will allow them to graduate in that quarter.

Students who register for work in excess of the approved load may be required by the dean to drop the overload during the Schedule Adjustment period.

Curriculum Model Change

When the University changes a curriculum model, students in the altered curriculum may be required to complete the subjects and hours placed above the level to which they had progressed. They will not, however, be required to complete additional subjects placed in the curriculum below the level they had achieved. Courses shifted from one class level to another are exempt from this latter provision. Students' deans will determine the revised subject requirements, and the Registrar will determine the revised total hour and grade-

point requirements. In no case, however, will the changed curriculum compel students to accumulate additional hours and grade points in order to graduate.

Classification

The undergraduate's classification will be determined by the number of credit hours earned at Auburn and elsewhere.

<i>Freshman</i>	47 or fewer quarter hours
<i>Sophomore</i>	48-95 quarter hours
<i>Junior</i>	96-143 quarter hours
<i>Senior</i>	144 or more quarter hours

The numbering sequence for identifying the classification of students is as follows; 1, Freshman; 2, Sophomore; 3, Junior; 4, Senior; 5, fifth year for Pharmacy, Architecture, and Veterinary Medicine; 10, Unclassified (non-degree students); 12, Special and Transient students and auditors only; 6, 7, 8, 9, 11, 13, and 14 are Graduate student classifications.

A student with a baccalaureate degree who undertakes a program for a second bachelor's degree will be classified as an undergraduate.

Auditing

Auditing of courses is restricted, and rarely permitted in laboratory courses. A student's audit privilege is granted only on the approval of the dean and the head of the department of the course involved.

Auditors not previously admitted to the University must be approved for registration by the Admissions Office. They must register and pay appropriate fees. Although listed on class rolls, auditors are not required to take part in classroom discussion, tests, examinations, or reports. They will receive no grade or credit; however, a student who does not attend or attend regularly the audited course will have "non-attendance" indicated by the course on his records.

Students may not change from audit to credit after classes begin, but may change from credit to audit within the first three weeks of classes. No refund of fees will be made except for changes made during the first two weeks of classes in accordance with University policy.

Class Attendance and Procedures

1. Students are expected to attend all their scheduled University classes. College work proceeds at such a pace that regular class attendance is necessary to receive proper instruction. Specific policies regarding class attendance are the prerogative of individual faculty members. Faculty shall inform each class in writing at the beginning of the course regarding the effect of absences on the determination of grades.

2. The student shall be expected to carry out all assigned work and to take examinations at the class period designated by the instructor. Failure to carry out these assignments or to take examinations at the designated times may result in an appropriate reduction in grade, except as provided in paragraph 4 below.

3. Instructors shall determine the policy regarding grading which they feel is best for the course. This policy shall be presented to the class, in writing, at the beginning of the quarter and will govern the actions of the instructor in the course.

4. Arrangements to make up missed work due to excused absences shall be initiated by the student. Instructors will be expected to excuse absences for:

a. Illness of the student or serious illness of a member of the student's immediate family. The instructor shall have the right to request appropriate verification.

b. The death of a member of the student's immediate family. The instructor shall have the right to request appropriate verification.

c. Trips for members of the student organizations sponsored by an academic unit, trips for University classes, and trips for participation in intercollegiate athletic events. When feasible, the student must notify the instructor prior to the occurrence of such absences, but in no case shall such notification occur more than one week after the absence. Instructors may request formal notification from appropriate university personnel to document the student's participation in such trips.

d. Religious holidays. Students are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays.

e. Subpoena for court appearance.

f. Any other reason the instructor deems appropriate.

5. The regularly accepted time for class to begin shall be 10 minutes after the hour. If the instructor does not appear within 20 minutes after the hour, it may be assumed the class is cancelled. All classes shall be dismissed promptly on the hour.

6. It is University Policy that all classes will meet as scheduled on the last day before and the first day after holiday periods designated by the University.

7. Unresolved problems regarding class attendance and or procedures should be referred to the University Student Grievance Committee.

Examinations

Examinations are classified as (1) final examinations at the end of each quarter; (2) special examinations; and (3) other course examinations as determined by the instructor. The final examination policy is stated below.

Announced tests in undergraduate courses will be administered at a regularly scheduled meeting of the course. Exceptions to this regulation may arise in specialized courses requiring performance or oral tests, and in multiple-sectioned laboratory classes requiring practical laboratory tests. Faculty having sound reasons for scheduling tests at times other than regularly scheduled meeting times are to obtain approval from the department head prior to the beginning of the quarter, and are to present a written schedule of these changes to the class during the first few days of the quarter. Rescheduled tests are not to interfere with other scheduled academic endeavors of the students involved, and an appropriate reduction in regularly scheduled class time is to be given to compensate for the rescheduled test period.

FINAL EXAMINATIONS. A final examination is a desirable means of evaluation in most undergraduate courses. In unusual circumstances, performance tests, term papers, research projects or other forms of evaluation appropriate to the objectives of the course may be substituted for a final examination with the approval of the department head, who will report his action to the dean and Vice President for Academic Affairs. Faculty not giving a final examination are to present to the class at the beginning of the quarter a written description of how final grades will be determined.

Final examinations should be administered during the hours specified in the quarterly examination schedule. Due to the specialized nature of many small upper-level undergraduate courses and graduate courses, deviations from this requirement are sometimes warranted. Such deviations are to be approved by the Vice President for Academic Affairs, and rescheduled examinations must not interfere with scheduled academic activities of the students involved. The professor teaching a 600-level course shall determine whether a formal final examination is appropriate.

Grades

Final passing grades are **A**, superior; **B**, good; **C**, acceptable; **D**, passing; and **S**, satisfactory. Final failing grades are **F**, failure; **FA**, failure for excessive absences; **XF**, absent from final examination and failing at the time; **U**, unsatisfactory; and **WF**, officially dropped with permission of the student's dean but failing at time of withdrawal.

ANG, no grade; thesis and dissertation research credit, is assigned to courses 699 Research for Thesis and 799 Research for Dissertation.

An **X** is assigned if the student is passing but missed the final examination, or if he has incomplete work and is absent from the final examination. An **IN** is assigned if the student has cleared the final examination but has not completed other required work. Grades of **X** and **IN** must be cleared during the student's next residence quarter or they will be recorded as permanent failing grades. A graduate student must clear an **IN** grade within two quarters; otherwise, the grade will be recorded as a permanent failing grade.

The first four days of each quarter are designated as the Special Examination period to remove **X** grades. The student will get a permit from the dean in order to make up a missed examination. A grade of **IN** will be changed by the Registrar upon written notice from the instructor. A final grade may be changed only by the written request of the instructor, with the approval of the department head and dean which must be submitted to the Registrar.

A grade of **F** and additional penalties may be assigned for academic dishonesty. See the Student Academic Honesty Code section in the *Tiger Cub* for further information.

GRADE ASSIGNMENT FOR CLASS WITHDRAWALS. No grade penalty shall be assigned for dropping a course on or before the fifteenth day of the quarter. (For courses with fewer than five meetings per week, 15 class days should not be confused with 15 class meetings.)

A student who withdraws from a course prior to the first 10 days will have no grade assignment; however, after the first 10 days but prior to the first 16 days a **W** (passing) grade will be recorded for the course.

If a course is dropped after the first 15 days, but by the date of mid-quarter, the instructor shall assign a grade of **W** (passing) or **WF** (failing) as the case may be. A course can be dropped with a **W** after mid-quarter only under unusual conditions. When approval for dropping the course under such circumstances is granted by the student's dean, a **W** may be assigned only when the instructor indicates that the student is clearly passing the course. Otherwise, a grade of **WF** is assigned.

GRADE AVERAGE AND QUALITY POINTS. A 4.0 grade scale is used. An **A** equals 4.0; **B**, 3.0; **C**, 2.0; **D**, 1.0; and **F** equals 0.0. Only course work attempted at Auburn University is used in determining the grade report average and continuation-in-residence requirements. **S** and **U** grades do not enter into grade-point computations.

S-U GRADING. Grades of **S** (Satisfactory) and **U** (Unsatisfactory) may be assigned only to courses approved to be graded S-U, and courses elected under the S-U option.

A junior or senior with a minimum overall grade average of 2.5 on at least 30 hours of credit earned at Auburn may elect any course to be graded on the S-U option, except for courses required in the freshman and sophomore years or for courses constituting the major as defined by the student's curriculum. A total of 20 credits may be earned at the rate of one course per quarter. The student will receive credit toward a degree for these courses, provided credit is normally accepted in his curriculum for this course work.

An unclassified student may schedule one or more courses on the S-U option with the approval of the dean. Course work completed on the S-U choice by unclassified students may not be applied later to degree requirements should the student become a degree candidate.

A graduate student may enroll in undergraduate courses, except for 500-level courses taken for graduate credit, under the S-U option on the major professor's recommendation.

Students are not permitted to change from S-U grading to conventional grading or vice versa after the schedule adjustment period.

REPEAT OF COURSES. No student may repeat a course for credit in which the student has previously earned a grade of **A**, **B**, or **C** without written permission by the student's academic dean. Courses specifically designated as repeatable in the *Auburn University Bulletin* are exempt from this regulation.

GRADE REPORTS. In compliance with the Family Educational Rights & Privacy Act, one copy of each student's grade report is mailed at the end of each quarter to the student at the address furnished by the student.

Dean's List

The name of every eligible student who meets certain scholastic requirements for a given quarter is placed on a list prepared for the dean of the student's College or School. This honor is also noted in the student's permanent record.

To meet Auburn University's requirements for inclusion on the dean's list, the student must be enrolled for 15 or more credit hours exclusive of any S-U option courses, pass all courses attempted for the quarter, and earn a grade-point average of at least 3.4 (on the 4.0 system). Furthermore, the dean of each College or School has established specific criteria governing inclusion on the list. The special requirements, applied in addition to the University regulations, are listed as follows:

College of Agriculture: 3.70 average.

School of Architecture: a grade-point average within the upper 10 percent of the full-time students enrolled in a given department.

College of Business: 3.80 average.

College of Education: 3.80 average.

College of Engineering: 3.70 average; only if an S-U graded course is required in the student's curriculum may it be included in the 15-hour minimum total.

School of Forestry: 3.70 average.

School of Human Sciences: 3.80 average.

College of Liberal Arts: 3.60 average.

School of Nursing: 3.75 average.

School of Pharmacy: 3.75; only if an S-U graded course is required in the student's curriculum may it be included in the 15-hour minimum total.

College of Sciences and Mathematics: 3.75 average.

College of Veterinary Medicine: grades in the upper five percent of the enrollment of each class.

Interdepartmental-Environmental Health: 3.65 average.

Resignation

Students who wish to resign from all course work for a quarter should contact their deans. They withdraw without penalty of failure if they resign no later than mid-quarter, a date specified in the University calendar.

After this date, the dean will obtain from the student's instructors his or her scholastic standing at the time of resignation, and report it to the Registrar. If the student is failing in over half of the work, the number of hours reported as failing will be counted as credit hours attempted and will be included in academic eligibility calculations. Those hours reported as passing will be dropped and will not be counted in the grade-point computation. Furthermore, when a student's total hours attempted, multiplied by two, exceed grade points earned by more than 45 at the end of the last quarter in residence prior to resignation, the grades will be reviewed by the dean to determine whether the student has a C average for the quarter in which he or she is withdrawing. Students not having C averages will be placed on academic suspension.

When a student through illness or physical disability is forced to resign after mid-quarter, and when this condition has been the main factor in causing scholastic deficiencies, discretionary power in waiving the scholastic penalty will rest with the student's dean. A student who is resigned for disciplinary reasons will retain the academic status achieved immediately prior to the disciplinary action.

Academic Probation and Suspension of Undergraduates

Auburn University may place an undergraduate student on probation or suspension at any time if the student flagrantly neglects academic work or makes unsatisfactory progress toward graduation.

Academic eligibility requirements for continuation in residence are calculated on Auburn University course work. Academic probation is a scholastic warning, indicating that the student is in danger of being suspended. A student on probation can continue enrollment without interruption. Academic suspension is a status that bars a student from continued enrollment at the University for a period of time.

A student will be placed on academic probation whenever the total number of hours attempted at Auburn, multiplied by two, exceed grade points earned by more than 25 except that no entering freshman will be placed on probation on the basis of the first quarter's work at the University.

A student may remove probation status by reducing the grade point deficiency to 25 or fewer grade points.

An individual on academic probation will be placed on suspension when the number of hours attempted at the University, multiplied by two, exceed grade points earned by more than 45. However a student will not be suspended at the end of a quarter in which a 2.0 (C) average was earned, but will be continued on probation.

A student's first academic suspension will be for a period of two quarters, summer quarter being counted as any other quarter. He or she will be readmitted on academic probation following the expiration of the first suspension. A student who incurs a second academic suspension is placed on indefinite suspension for at least four quarters before an application for readmission will be considered.

An academically suspended student who has incomplete or other deferred grades which could, when cleared, remove the suspension will be permitted to register conditionally for the next quarter. The suspension must be removed within two weeks of the beginning of the quarter; otherwise the student will be resigned by the Registrar's Office.

No credit earned at another institution by a student on academic suspension from Auburn will be used in clearing a suspension or in meeting requirements for an Auburn University degree.

A student who resigns after mid-quarter may be subject to academic suspension. (See Resignation for further information.)

COLLEGE OF ENGINEERING. Students enrolled in a professional curriculum in the College of Engineering may be placed on Engineering academic suspension if their overall grade averages drop below a 2.0. Specific details are listed in the College of Engineering section of this catalog.

SCHOOL OF PHARMACY. A student enrolled in the School of Pharmacy who is placed on academic suspension and who wishes to re-enter the School must, in addition to complying with other University readmission requirements, be approved for readmission by the Pharmacy Admissions Committee and, when applicable, by the University Admissions Committee.

COLLEGE OF VETERINARY MEDICINE. Any student who earns less than a 2.25 grade-point average for any quarter will be placed on academic probation. A student who fails to earn a 2.25 grade-point average for any two quarters in the same academic or calendar year may be dropped from the College of Veterinary Medicine for scholastic deficiency. In addition, a student who does not have an overall average of 2.25 for an academic year or who does not have a veterinary overall average of 2.25 for an academic year or who does not have a veterinary school cumulative average of 2.25 at the end of any academic year may be required to withdraw from the College of Veterinary Medicine.

A student who makes a grade of **F** on any course may be dropped from the College of Veterinary Medicine until such time as the course is offered again. Such student may be required to repeat certain other courses in the curriculum for the quarter in which a grade of **F** was earned.

Students who are dropped under the above provisions are eligible for admission to other curricula provided they meet the general scholastic requirements for continuance in the University. Scholastic penalties incurred during enrollment in the College of Veterinary Medicine will become part of the student's record.

Satisfactory Progress

STUDENT ATHLETES: In addition to meeting the general academic requirements of the University, student athletes must meet all academic requirements, including those relating to satisfactory progress toward a degree, set forth in the legislation of the Southeastern Conference (SEC) and of the National Collegiate Athletic Association (NCAA).

STUDENT FINANCIAL AID RECIPIENTS: In addition to meeting the general academic requirements of the University, applicants for student financial aid funds must maintain Satisfactory Academic Progress in order to receive, or to continue to receive, assistance through federal, state, and institutional student aid programs. Detailed descriptions of these Satisfactory Academic Progress requirements for distinct classifications of Auburn students are available from the Office of Student Financial Aid.

Advanced Standing and Credit

Prospective students are advised to write the Registrar's Office at Auburn University requesting a brochure on the Advanced Placement Program.

Entering students with superior preparation or with special competence in a specific area may qualify for advanced placement or credit. Placement or credit may be granted on the basis of Advanced Placement Examinations of the College Board, scores on college ability or achievement tests, departmental proficiency examinations, College Level Examination Program (CLEP) General and Subject examinations, and other evidences of experience and competence.

Students enrolled at Auburn may apply to an academic department for a Departmental Proficiency Test if they have demonstrated a reasonable basis of experience or study in the subject area. If they score a satisfactory grade on the examination, they will be eligible for placement in an advanced course and for credit in the subject. Students who have previously enrolled for the subject at Auburn are not eligible for this test in the same subject.

The amount of advanced placement credit granted in each subject area is determined by the recommendation of the academic teaching department with the approval of the student's academic dean and the Registrar.

Students transferring to Auburn, who have received advanced placement credits from another institution may be awarded these credits insofar as Auburn's requirements for awarding such credits are met. Advanced placement credits may not be substituted for residency requirement.

Correspondence and Extension Credit

A student may earn a maximum of 25 percent of the total credits required for the baccalaureate degree by correspondence or extension; however only 18 hours of the final year's work may be earned thus. An individual having less than three quarters in residence prior to the last academic year may earn only 15 hours by correspondence or extension.

A student in residence may not enroll in a correspondence course if the course or a suitable substitute can be scheduled. The resident student may not exceed the maximum class hour load by adding a correspondence course. A student must have prior approval of his/her Auburn dean if the credits are to be applied toward an Auburn degree.

The grade earned for correspondence credit will be entered on the student's record.

Information on available courses may be obtained from the Independent Study Office, 100 Mell Hall, Auburn University, Alabama 36849, (205) 826-5100.

Military Science and Physical Education Credit

A student may be allowed a maximum of 18 credits in military science courses toward graduation, insofar as the credits are applicable to the student's curriculum. Of these 18 credits a maximum of 6 credits of basic ROTC at the rate of 1 credit per course is allowed toward graduation.

A student may be allowed 6 credits on physical education activity courses toward graduation.

A student who has served in the Armed Forces may receive physical education credits as follows: for less than six months service, no credit; for six months to less than a year, two hours credit for Physical Education; for one year or more in the service, three hours of credit. Credits may also be allowed for military service courses. Application for credit for military experience should be submitted to the Registrar. The student's academic dean must approve credit into the student's curriculum.

Degree Requirements

To earn the bachelor's degree students must complete the subjects in their curriculum and must earn at least a C average on credits accepted for their degree program. Individuals with credit from other institutions must also have a C average on their Auburn course credits used in their curriculum toward graduation. Students in Business and Engineering curricula must have a C average on all work attempted at Auburn. Students in Engineering must also have a C average in their major courses. Credits required for graduation range from 196 to 257 hours.

To earn the bachelor's degree from the School of Human Sciences, students must earn a minimum overall grade average of C on all subjects in their majors and on all course work attempted at Auburn University. This change became effective Summer Quarter, 1986, for all entering freshmen and transfers.

The student's dean clears subject requirements in the curriculum; the Registrar clears total hour, grade point, and freshman English.

Forty-five hours must be earned in residence in order to receive a bachelor's degree. As a general rule the 45 hours must be taken in the final year and in the school or curriculum of graduation. The student's dean may waive the final year's residence, and may also allow course credit to be earned at another institution during the final year. However the 45 hours in residence at Auburn is a firm requirement.

To complete a second baccalaureate degree, an Auburn graduate must complete an additional 45 hours, at least 90 grade points, 36 weeks in residence, and satisfy course requirements in the curriculum. Graduates of another four-year institution who seek a bachelor's degree at Auburn must complete the hours required in the final year of their curriculum and satisfy the requirements listed immediately above.

Seniors must clear deferred grades by the tenth day of the graduation quarter for courses to be used toward degree requirements. Correspondence courses must be completed by mid-quarter prior to graduation.

A graduation fee is payable to the Cashier's Office, at the beginning of the quarter of graduation. If a student is in default on any payment due the University, the diploma and academic record will not be issued until the matter is cleared.

Degrees are conferred at Commencement exercises each quarter. If a student does not plan to attend the exercises, arrangements should be made with the dean or the Registrar to receive the degree *in absentia*.

Beginning Fall Quarter 1994, to earn a bachelor's degree a student must earn a minimum overall grade average of C on all course work in the major, and a minimum overall grade average of C on all Auburn course work applied to the degree, and a minimum grade average of C on all transfer credits applied to the degree.

Graduation Honors

Students with a minimum overall grade average of 3.4 are graduated *With Honor*; a 3.6 *With High Honor*; and a 3.8 *With Highest Honor*. This distinction of high academic achievement is placed on the student's diploma and on his/her permanent record.

The grade average for graduation honors must be achieved on Auburn University course work. At least 90 hours in residence at Auburn University are required for graduation honors. Grades of S or U and noncredit courses are not used in the calculations. Students earning a second baccalaureate degree must earn the minimum overall grade average required for honor distinction on the additional hours completed for the second degree. Those additional hours must total at least 90 credit hours.

Student Academic Grievance Policy

The Student Academic Grievance policy, which appears in full in the student handbook, *Tiger Cub*, is designed to resolve academic grievances of students which result from actions of faculty or administrators.

Confidentiality of Student Records

The University recognizes that the maintenance of student information and educational records is necessary and vital to assist the student's education and development and to provide opportunities for University research and policy formulation. The University recognizes its obligation to exercise discretion in recording and disseminating information about students to insure that their rights of privacy are maintained.

The University will furnish annual notification to students of their right to inspect and review their educational records; the right to request amendment of educational records considered by them to be inaccurate or misleading or that violate privacy or other rights; and of their right to a hearing should the University decline to amend such records. This annual notice will be published in the University's Bulletin.

The following guidelines have been developed to insure the privacy rights of students. For the purposes of this policy statement a student is defined as an individual who has been admitted and has been in attendance in a component unit of the University. Classification as a student in one component unit of the University (e.g., an undergraduate program) does not infer that the person has been accorded the rights outlined below in other component units (i.e., graduate school, professional schools, branch campus).

Student Access to Records

Students have the right to be provided a list of the type of educational records maintained by the University which are directly related to the student; the right to inspect and review the contents of these records; the right to obtain copies of these records; the right to a response from the University to reasonable requests for explanation and interpretation of these records; the right to an opportunity for a hearing to challenge the content of these records; and if any material or document in the educational record of a student includes information on more than one student, the right to inspect and review only the part of such material or document as relates to the student.

Students do not have access to: financial records of their parents; confidential letters and statements of recommendation which were placed in the educational record prior to January 1, 1975, provided such letters or statements were solicited or designated as confidential and are not used for purposes other than those for which they were specifically intended; confidential recommendations, if the student signed a waiver of the right of access, respecting admission, application for employment, and the receipt of an honor or honorary recognition.

Students do not have access to: instructional, supervisory, and administrative personnel records which are not accessible or revealed to any other individual except a substitute;

Campus Security records which are maintained apart from educational records, which are used solely for law enforcement purposes, and which are not disclosed to individuals other than law enforcement officials of the same jurisdiction; employment records except when such employment requires that the person be a student; and the Alumni Office records.

Students do not have access to physical or mental health records created by a physician, psychiatrist, psychologist or other recognized professional acting in his or her capacity or to records created in connection with the treatment of the student under these conditions which are not disclosed to anyone other than individuals providing treatment. These records may be reviewed by a physician or appropriate professional of the student's choice.

Procedures for Access

The Registrar's Office has a complete list of educational records maintained by the University which students may obtain. Students should contact the appropriate office to inspect and review their records. An office may require that a University official be present when a student inspects and reviews his educational records. Any questions concerning a student's access to records should be directed to the Registrar.

Release of Directory Information

Directory information may be released by the University without the student's written consent. Directory information consists of all items listed on the student's registration card, participation in recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, the most recent previous educational agency or institution attended, and other similar information.

A student may deny the release of directory information by requesting that the information not be released. This should be done at registration time. The student who is in attendance must notify the Registrar's Office in writing each quarter of enrollment to deny the release of this information. To deny the release of participation in recognized activities the student must notify the Vice President for Student Affairs and the Academic Dean in writing. To deny the release of athletic information the student must notify the Director of Athletics in writing. To deny the release of directory information a student must give the above notification each quarter of registration. A former student, one who is not in attendance, must contact the appropriate offices above to deny the release of directory information.

Release of Educational Records

The University will release a student's educational record(s) upon the student's written request. The student must:

1. Specify the records to be disclosed.
2. Include the purpose or purposes of the disclosure.
3. State the party or parties and the address to whom the information is to be disclosed.

The student shall, upon request, receive a copy of the record that is to be disclosed. It is University policy to furnish single copies of a student's record at no charge except for the standard transcript fee, if applicable.

The University may release students' educational records to the following without prior written consent:

1. University officials who have a legitimate educational interest in the records. University officials are defined as teachers, administrative personnel and other employees except personnel of the security or law enforcement unit of Auburn University who in the performance of their normal duties require access to student records. If University officials are required in the performance of their duties to review the educational records of a student, this will be considered to be a legitimate educational interest.

2. Officials of another school in which the student intends to enroll upon request of the transfer school.

3. Government representatives of the Comptroller General of the United States, the Secretary of Education, the U.S. Commissioner of Education, the Director of the National Institute of Education, the Assistant Secretary for Education, State educational authorities, and State officials to whom such information is specifically required to be reported or disclosed by State law adopted prior to November 19, 1974.

4. Appropriate authorities in connection with financial aid with the understanding that only the necessary records will be released.

5. To organizations conducting studies for, or on behalf of, the University or its agencies for the purpose of developing, validating, or administering predictive tests, administering student aid programs, and improving instruction and student life provided that the studies will not permit the personal identification of students and their parents by individuals other than representatives of the organization and provided that the personally identifiable information furnished will be destroyed when no longer needed for the purposes for which the study was conducted.

6. To accrediting organizations to carry out their accrediting functions.

7. To parents of a dependent student as defined in section 152 of the Internal Revenue Code of 1954. University officials may release educational records to parents on the basis of a written certification from the parent that the student is a dependent as defined under the Code.

8. To comply with a judicial order or lawfully issued subpoena with the understanding that the student will be notified in advance insofar as possible.

9. To appropriate parties to protect the health and safety of the student or other individuals in emergencies with the understanding that only information essential to the emergency situation will be released, that information will only be released to a party who would be in a position to deal with the emergency, and that the student will be notified insofar as possible of the information released, the purpose for the release, and to whom the information was released.

No personal information on a student will be released without a statement from the University to the party receiving the information that no third party is to have access to such information without the written consent of the student.

Each office with educational records will maintain a record of each request and disclosure of personally identifiable information from the educational records of a student except for information requested in writing by the student, information released to the student or the student's parents, directory information, and information released to University officials and teachers who have a legitimate educational interest in the records. The student may inspect the record of requests, disclosures and the legitimate interests of parties requesting or obtaining information in the appropriate University office.

Amending Educational Records

Students may request that any information contained in their educational records which they consider to be inaccurate, misleading, or in violation of their privacy or other rights be amended or deleted from the records. (A grade or other academic scores may not be amended, except that the accuracy of recording the information may be challenged.)

Students who request that information in their records be amended should first direct their request to the official with primary responsibility for the information on the record. If the matter is not resolved to their satisfaction, students should direct their requests to the official's dean or division head. If the matter is not resolved to their satisfaction, they may request a formal hearing.

Right to a Formal Hearing and Procedures for Decision

Students may request formal hearings to challenge information contained in their educational records. The hearing will be held in a reasonable time (not to exceed 45 days) and in a reasonable place. Students may be assisted or represented by persons of their choice, including an attorney, at the expense of the student, and shall be afforded a full and fair opportunity to present evidence relevant to the issue(s).

Students or their representative should request the hearing in writing and should specifically identify the information they seek to have amended. The request should be directed to the Vice President for Student Affairs.

The Vice President for Student Affairs will conduct the hearing and render a decision within a reasonable period of time after the conclusion of the hearing and the decision shall be based solely upon the evidence presented at the hearing. The student shall be notified in writing of the reason(s) for the decision and a summary of the evidence.

If the decision is that the information in the student's educational records is inaccurate, misleading or in violation of his rights and privacy, the statement(s) will be corrected or expunged from the student's records.

If the decision is that the information is not inaccurate, misleading, or in violation of the privacy or other rights of the student and that the information or parts thereof is to remain in the student's educational records, the student shall be notified and given the right to enter a statement in the records setting forth any reason for disagreeing with the decision of the Vice President for Student Affairs. This statement shall be maintained in the records as long as the record or contested portion thereof is maintained, and if the contested educational record or contested portion thereof is disclosed by Auburn University to any party, the student's explanation shall also be disclosed to that party.

The Secretary of Education has established a review board to receive complaints regarding violation of students' rights. Students wishing to file a complaint directly to the review board should write to the Family Policy and Regulations Office, Department of Education, Washington, D.C. 20202. Detailed procedures for this complaint procedure are

listed under section 99.63 of the regulations issued by the Secretary and will be furnished upon request by the Registrar, Auburn University.

This policy is adopted pursuant to the Family Educational Rights and Privacy Act, (34 CFR Part 99), and is not intended to impose any restrictions or grant any rights not specifically required by this Act.

Housing and Residence Life

Auburn University offers a variety of on-campus housing accommodations for students. There are 22 residence halls and 138 apartments to house single students. There are 384 apartments to house married, graduate and upperclass students. All are convenient to classrooms, cafeterias, laundries, mail rooms and recreational areas.

Residence Halls and Single Student Apartments

Apartments for single students are located in Caroline Draughon Village Extension, at the intersection of Wire Road and Roosevelt Drive. The residence halls, with the exception of Noble Hall on Magnolia Ave., are clustered in two areas on the campus.

The Quadrangle Complex consists of:

I	Elizabeth Harper Hall	VII	Mary Lane Hall
II	Kate Conway Brown Hall	VIII	Ella Lupton Hall
III	Willie Little Hall	IX	Helen Keller Hall
IV	Kate Teague Hall	X	Marie Bankhead Owen Hall
V	Letitia Dowdell Hall	XII	Dana King Gatchell Hall
VI	Allie Glenn Hall		

The Hill Complex Consists Of:

A	Mollie Hollifield Hall	F	Dixie Graves Hall
B	Annie Smith Duncan Hall	G	Camille Early Dowell Hall
C	Marguerite Toomer Hall	H	Stella Knapp Hall
D	Zoe Dobbs Hall	J	Mary Boyd Hall
E	Berta Dunn Hall	K	Sara Sasnett Hall

Single student housing includes the following types of living accommodations:

TYPE I

Two bedroom (four students) apartments furnished; air-conditioned; TV cable, carpeted; rent, \$485 per student per quarter. (Caroline Draughon Village Extension, Buildings A-F).

TYPE II

Suites consisting of two double rooms with connecting bath; air-conditioned; rent, \$460-470 per student per quarter. (Hill dorms A-K, Quad dorms 1,2,3,4,7 & 8).

TYPE III

Suites consisting of two double rooms with connecting

bath; non-air-conditioned; rent, \$410 per student per quarter. (Quad dorms 5,6,9 & 10).

TYPE IV

Double rooms with community baths on each floor; air-conditioned; rent, \$320 per student per quarter in Noble Hall.

TYPE V

Double rooms with community baths on each floor; non-air-conditioned; rent, \$275 per student per quarter (Quad dorm 12).

Students contract directly with the telephone company for telephone service in their living quarters.

The prices listed above are subject to change. Any rate increase will be announced prior to the cancellation date for the quarter the Agreement is to begin.

Specially equipped facilities for handicapped students are provided in four campus residence halls and fourteen apartments. These facilities include wheelchair ramps, specially designed bathrooms, and modified furnishings.

Each residence hall is staffed with a Hall Director who serves as a counselor to the students. Students' rooms are furnished with single beds, study desks, mirrors, chest of drawers, chairs, and closets. Residents may bring other furnishings including study lamps, bedspreads and linens, curtains or drapes, rugs or carpet, extra book shelves, radios, stereos, television sets, plants, posters, and small refrigerators. Students are encouraged to bring room fans for non-air-conditioned halls, but room air-conditioners are not allowed. Most residence halls have kitchens for use by the occupants and lounges for entertaining or watching television.

The apartment complex for single students (Caroline Draughon Village Extension) is within walking distance of all classroom buildings and recreation and sports facilities. These two-bedroom apartments accommodate four students. Each apartment has an all-electric

kitchen and features modern furnishings, carpeting, and venetian blinds. Beds are extra-long twin size. Students should bring their own linens, dishes, utensils, and other items to personalize their apartments. TV cable is included in the rent. Parking areas are adjacent to the apartments. Laundry facilities, a delicatessen, snack area, and a study lounge are in the complex.

Married, Graduate, and Upperclass Students

Apartments for married students are located in Caroline Draughton Village. Single graduate and upperclass students reside in the Village on a limited basis. These apartments are grouped in two-story brick buildings of 8, 16, and 20 units. Each apartment has a separate outside entrance. The apartments feature all-electric kitchens, furnished living and dining rooms and bedrooms, spacious closets, ample cabinets and baths with shower-tub combinations. A limited number of unfurnished apartments is available. Monthly rent includes heat, water, solid waste disposal, sewage, garbage pickup and TV cable. Electricity and telephone charges are the responsibility of the resident.

There are 224 two-bedroom and 160 one-bedroom apartments in Caroline Draughton Village. These units include the following types of living accommodations.

TYPE A

Two bedroom apartments; central air-conditioned; rent per month: \$325 furnished, \$315 unfurnished.

TYPE B

Two bedroom apartments; 18,000 BTU air-conditioner in master bedroom; rent per month: \$275 furnished, \$265 unfurnished. Renovated, \$300.

TYPE C

Two bedroom apartments; non-air-conditioned; rent per month: \$265 furnished, \$255 unfurnished. Renovated, \$290.

TYPE D

One bedroom apartments; 18,000 BTU air-conditioner in master bedroom; rent per month: \$255 furnished, \$245 unfurnished. Renovated, \$275.

TYPE E

One bedroom apartments; non-air-conditioned; rent per month: \$245 furnished, \$235 unfurnished. Renovated, \$265.

The prices listed above are subject to change. Any rate increase will be announced prior to the cancellation date for the quarter the lease is to begin.

A Reservation in University Housing is not Valid Unless the Applicant has been Admitted to Auburn University.

Admission to Auburn University does not automatically include a space in University housing. It is the responsibility of the student to make housing arrangements either on or off campus. Housing information is sent to entering students with their provisional acceptance to the University.

Students may apply for any number of quarters within the Summer-Fall-Winter-Spring contract period by submitting a Housing Application with a \$15.00 (non-refundable) processing fee. Priority for housing is based upon the date the application, with processing fee, is received and the number of quarters applied for. Students entering University housing summer quarter have priority over those entering University housing fall quarter.

The Housing Agreement, when offered, will be for a space (apartment, if married) in University Housing. In order to make a reservation in University Housing, the Housing Agreement must be returned to the Housing Office promptly with a \$100.00 check for the housing deposit.

Deposits may be made by check payable to Auburn University and must be received at the Housing Office, Burton Hall, Auburn University, Alabama. The deposit is a combination room reservation/damage/room clearance deposit and is not applicable to rental payment, except on cancellation as provided within the Housing Agreement. The Housing Agreement outlines conditions under which refunds will be made.

University Housing, with the exception of Caroline Draughton Village (older section), officially opens for occupancy on the day preceding registration and schedule adjustment and closes and must be vacated by the day following graduation for each quarter. Residence halls do not remain open for the Thanksgiving break.

Rent for spaces/apartments in Caroline Draughton Village (older section) includes holidays and between quarter breaks. Occupancy in the Caroline Draughton Village (older section) may begin prior to academic quarters as apartments are vacated.

Occupancy prior to the official opening of University Housing requires prorated rental payments.

Quarterly rental payment (monthly for students in Caroline Draughton Village) is due and must be received in the Housing Cashier's office on the applicable payment due date. If the student is not a resident of University Housing at the time his or her Agreement is signed, the student's rental payment must be received by the payment due date specified on the room/apartment assignment letter. If the student is a resident of University Housing at the time his or her Agreement is signed, the student's rental payment must be received on the applicable payment due date for the quarter the Agreement is to begin.

The payment due date for students in Caroline Draughton Village is the first day of each month. When full rental payment is not received by the applicable payment due date, the University may cancel the Agreement or accept late payment, assessing the student a late payment fee of \$10.00 for each seven day period between the due date and receipt of full payment. Refer to the Housing Agreement for other collection remedies.

Off-Campus Housing

Privately-owned dormitories, fraternities, apartments, houses, and mobile homes in the Auburn community also provide living quarters.

The University neither inspects nor approves off-campus housing. The facilities must, however, conform to federal regulations and to the local code of health and safety regulations.

A listing of off-campus housing facilities may be obtained by writing the Housing Office, Burton Hall, Auburn University, AL 36849, or by visiting any of the following offices: Housing, Admissions, Foy Union Desk and Cater Hall.

Food Services

Auburn University Food Services is a non-profit organization supported entirely by food sales in the various Food Services operations located on campus. The individual operations, varying in size and composition, offer a wide variety of services to meet the needs of students, as well as faculty, staff, and visitors to the Auburn campus. All services offered to students are strictly on a voluntary basis and are available to students living both on and off campus. A brief synopsis of each unit's location and services follows:

War Eagle Cafeteria, located in the Foy Student Union, offers complete cafeteria services and a full line snack bar. War Eagle also houses the University Faculty Club and is responsible for all University Catering.

Terrell Cafeteria, located in "the hill" dormitory complex, offers full cafeteria services, a bakery outlet, and a snack bar that remains open late night.

The Kitchen Deli, located in the Caroline Draughton apartment village, contains a grocery outlet, a bakery outlet, meats and cheeses by the pound, and a take out only snack bar, that remains open late night.

The Li'l Eagle, located on the west side of Terrell Cafeteria, provides convenience items for the Hill dorm residents, including baked goods, and grocery items.

Sewell Cafeteria, located in the athletic dorm, is operated by Food Services for scholarship athletes.

The Bakery, located in Terrell Cafeteria, offers a wide range of freshly baked breads, cookies, cakes, desserts, and pastries shipped daily to our operations. Cakes for special occasions are baked "to order."

The Hill, located in the Terrell Complex, serves nightly, Sunday through Thursday.

Meal Plan — The Chef's Club — Students have the opportunity to become members of the Chef's Club, Food Services meal plan. As members of the Chef's Club, students may choose between a pre-payment plan or a charge plan. The pre-payment plan or "declining balance plan" allows the student to pay in advance, and budget that amount through the quarter. The charge plan offers students the convenience of charging their meals in any of the food service operations located on campus. A membership fee of \$6.00 per quarter will be paid as follows:

Members joining summer quarter — \$24 fee — card valid through spring quarter

Members joining fall quarter — \$18 fee — card valid through spring quarter

Members joining winter quarter — \$12 fee — card valid through spring quarter

Members joining spring quarter — \$6 fee — card valid through that quarter only

If a student graduates or leaves school, the membership fee will be reimbursed for each complete unused quarter.

Students may receive credit approval by furnishing a parent's notarized signature as co-signer or by furnishing two credit references. Chef's Club charges are billed on a monthly basis and the total amount must be paid within ten days after the mailing. All Chef's Club bills must be paid before a student can register for the next quarter.

Many students who join the Chef's Club have a charge account for the first time. Chef's Club card holders need to be aware that charges can accumulate rapidly and all charges have to be paid. However, students soon learn that, with common sense and discretion, having a Chef's Club card can be both a fun and educational experience.

Additional information about the Chef's Club may be obtained from The Tiger Club Accounts, located in the Food Service Administration Bldg., Auburn University, Alabama 36849, Telephone: 826-5735.

Cash is accepted at all food operations located on campus. However, an advantage of a Chef's Club card or meal plan is that the student does not have to worry about carrying cash at all times during the quarter.

Student Health Center

The Health Center is concerned with the health needs of students while attending Auburn and consists of out-patient services and limited in-patient day care. The out-patient clinic, equipped with modern x-ray and laboratory facilities, is staffed with physicians and nurses who provide primary care to the students. Preventive and educational programs are utilized to help students function at their optimal level and to help prepare them for life after school.

Services, including personal assessment/counseling services, are made available through mandatory health fees which are paid with tuition. Most services are covered, however, fee for service charges may be made on tests and supplies to defray the cost. Services are available to currently enrolled students only.

Hours of Operation:

Fall, Winter and Spring Quarters —Open Monday-Friday 8:00 a.m. - 8:00 p.m.
Saturday 9:00 a.m. - 12:00 noon
Summer Quarter —Open Monday-Friday 8:00 a.m. - 4:45 p.m.

Closed on University Holidays. The Health Center closes at 4:45 p.m. on the day preceding a University holiday until 8 a.m. on the day following the holiday.

Between Quarters service is available on Monday-Friday to students registered for the next quarter 8 a.m.-4:45 p.m.

Student Insurance: The Student Government Association sponsors an Accident and Sickness insurance plan which is available to all registered undergraduate and graduate students, spouses and dependents. The plan provides maximum coverage at minimum cost. Additional information on insurance is available at the Student Health Center. The SGA sponsored health insurance or equivalent is required for all international students, and recommended for all students.

Financial Aid

The Office of Student Financial Aid at Auburn University provides financial assistance to students who need aid in order to attend the University. The University believes that the amount of aid granted should be based on financial need. To determine need, Auburn uses the ACT Need Analysis System of the American College Testing Program. Students seeking assistance are required to submit the Family Financial Statement to the ACT Program annually. Applications for aid should be completed in January or February of the year prior to the academic year in which the student will need assistance. Application materials and a brochure describing available aid programs may be obtained from the Office of Student Financial Aid, 203 Mary Martin Hall.

The financial aid for which students may apply includes scholarships, grants, loans and part-time employment.

Scholarships may be awarded to undergraduates who have shown high academic attainment and promise. Some scholarship programs also require a demonstration of financial need. *Pell Grants* are provided to undergraduate students who can demonstrate need. *Supplemental Educational Opportunity Grants* are available, in limited number, to undergraduates with financial need.

Perkins Loans, Stafford Loans, and Institutional Loans provide long-term, low interest loans to students who can demonstrate need.

The *College Work-Study Program* provides part-time employment for students who demonstrate financial need. The *Health Professions Loan Program* makes available long-term loans for students in Pharmacy and Veterinary Medicine.

Graduate students may be eligible for teaching and research assistantships and traineeships. Information is available from the head of the department of the student's major field.

Employment

Students seeking part-time employment while attending the University should contact the Student Employment Service. As a referral agency, the service assists students in finding employment on campus as well as maintaining bulletin boards with notices of job openings with businesses and industries in the local area. Applicants for employment are referred to prospective employers on the basis of the date of application and the skills of the applicant.

Auburn University employs in excess of 2,500 students on an hourly basis. Students may work a maximum of 30 hours per week while enrolled for six or more quarter hours. The number of hours set by off-campus employers may vary but usually range from 10 to 30 hours per week.

Applications and additional information may be obtained from the Student Employment Service, 300 Mary Martin Hall.

Student Development Services

Career Counseling Services provides confidential assistance to students who need help with career exploration, curriculum selection, study skills, and developmental concerns. A career library is organized to provide accurate and current information about a wide variety of careers. Seminars and workshops of interest to students are offered quarterly. Come by 304 Martin Hall or call 826-4744.

Testing Services supports the above counseling process through the provision of a wide variety of inventories and tests as well as the provision of a Study-Partners Program and programmed kits designed to improve study skills. Additionally, Testing Services is a center for many national testing programs such as ACT, SAT, GRE, CLEP, and GED. Come by 315 Martin Hall or call 826-5972.

Placement Services assists students and alumni in securing business and professional positions through contacts with potential employers. Representatives of firms and agencies visit the campus each quarter for personal interviews with students. Counselors are available to assist students and alumni with all aspects of the job search such as resume writing, interviewing skills, defining career goals and job search strategies. Undergraduate and graduate students who desire information and assistance should visit Placement Services early in the year. Come by 400 Martin Hall or call 826-4313.

Student Government Association

Upon enrollment at Auburn University, each student becomes a member of the Student Government Association, the official organization of the student body. The SGA is the voice of the students, promoting cooperation and communication with the faculty, administration, the Auburn City Council, and the state legislature. The SGA also promotes the social and academic life of Auburn students.

The SGA is organized into three branches. Headed by the SGA President, the executive branch takes on many special projects through the Executive Cabinet. The legislative branch, the SGA Senate, is made up of representatives of each school and college. The judiciary branch makes final judgment on all decisions involving the Code of Laws. The Student Government Constitution and Laws, published in the *Tiger Cub*, detail the functioning of the student government.

Student Communications — The following media are subject to supervision by the Board of Student Communications:

The Auburn Circle, a general interest magazine
The Glomerata, the yearbook issued each spring
The Auburn Plainsman, the weekly student newspaper
The Tiger Cub, annual student handbook
WEGL-FM, the student operated campus radio station

Other publications include the *Auburn Design*, published yearly for and by students in Industrial Design; the *Auburn Veterinarian*, a quarterly published by and for students in Veterinary Medicine; and the *Auburn Pharmacist*, issued once a quarter by the School of Pharmacy.

The Foy Union — This facility serves as a focal point for co-curricular student activities as well as other campus programs. Housed within the confines are the *Plainsman*, *Glomerata*, SGA, IFC, University Program Council, Special Programs, War Eagle Cafeteria, a recreation room, a reading room, a wood-working hobby shop, and an exhibit gallery. It also provides lockers for commuters, a 24-hour banking service, a lost and found service, several lounge areas, a large screen TV, and an assortment of meeting and banquet rooms. In addition, a University-wide information center and a calendar of events are maintained by the Union staff.

The University Program Council — The University Program Council serves as a clearing house for campus programs as well as providing a wide range of programs and entertainment through the following committees: Fine Arts, Major Entertainment, Horizons, Publicity, Special Events, Outdoor Recreation, Indoor Recreation, Films, Religious Affairs, and Public Relations. The experience students acquire in planning and executing these programs offers them the opportunity to enhance their personal growth and development.

Langdon Hall — This auditorium is located next to historic Samford Hall and has a capacity for more than 500 people. Weekly, this is the site of the UPC free movie.

Eagle's Nest — Located atop the north end of Haley Center, this lounge offers a spectacular view of the University. It may be reserved for University-related meetings by contacting the Foy Union Office (826-4246).

The University Chapel — The University Chapel, located on the corner of South College Street and Thach Avenue, is open on weekdays for students, faculty, and staff. It is used for prayer and meditation and may be reserved for weddings, religious, and certain other University events by contacting 228 Foy Union. The use of the organ is supervised by the Department of Music.

Organizations

The student handbook, *Tiger Cub*, available in the office of Student Affairs, has a complete listing of the more than 300 chartered and officially recognized organizations on the Auburn campus. Most of these organizations are open to any interested student.

Among the national organizations on campus there are honor societies, national recognition societies, social sororities and social fraternities. They are:

National Honor Societies

The following members of the Association of College Honor Societies have established chapters at Auburn:

Alpha Epsilon (Agricultural Engineering)	Omicron Nu (Home Economics)
Alpha Epsilon Delta (Pre-Medicine)	Phi Alpha Theta (History)
Alpha Kappa Delta (Sociology)	Phi Eta Sigma (Freshman Scholarship)
Alpha Lambda Delta (Freshman Scholarship)	Phi Kappa Phi (Senior Scholarship)
Alpha Phi Sigma (Criminal Justice)	Pi Delta Phi (French)
Alpha Pi Mu (Industrial Engineering)	Pi Lambda Sigma (Pre-Law)
Alpha Sigma Mu (Metallurgical & Materials Engineering)	Pi Sigma Alpha (Political Science)
Beta Alpha Psi (Accounting)	Pi Tau Sigma (Mechanical Engineering)
Beta Gamma Sigma (Business)	Psi Chi (Psychology)
Chi Epsilon (Civil Engineering)	Rho Chi (Pharmacy)
Delta Sigma Rho-Tau Kappa Alpha (Forensics)	Sigma Delta Pi (Spanish)
Eta Kappa Nu (Electrical Engineering)	Sigma Gamma Tau (Aerospace Engineering)
Kappa Delta Pi (Education)	Sigma Pi Sigma (Physics)
Lambda Sigma (Sophomore Leadership)	Sigma Tau Delta (English)
Mortar Board (Student Leadership)	Tau Beta Pi (Engineering)
Omega Chi Epsilon (Chemical Engineering)	Tau Sigma Delta (Architecture & Allied Arts)
Omicron Delta Kappa (Student Leadership)	Xi Sigma Pi (Forestry)

National Recognition Societies

The following national societies have chapters established at Auburn:

Alpha Eta Rho (Aviation)	Order of Omega (Greek Leadership)
Alpha Phi Omega (Service)	Pershing Rifles (Military)
Alpha Phi Sigma (Criminal Justice)	Phi Delta Kappa (Education)
Alpha Tau Alpha (Agricultural Education)	Phi Delta Chi (Pharmacy)
Angel Flight (Air Force ROTC Auxiliary)	Phi Lambda Sigma (Pharmacy)
Arnold Air Society (Air Force ROTC)	Phi Lambda Upsilon (Chemistry)
Block and Bridle (Animal Husbandry)	Phi Mu Alpha (Music)
Capers (Army ROTC Auxiliary)	Phi Psi (Textiles)
Delta Nu Alpha (Transportation)	Phi Zeta (Veterinary Medicine)
Delta Omicron (Music)	Pi Alpha Xi (Horticulture)
Delta Sigma Pi (Commerce and Business Administration)	Pi Lambda Theta (Education)
Gamma Sigma Delta (Agriculture)	Pi Mu Epsilon (Mathematics)
Kappa Epsilon (Pharmacy)	Scabbard and Blade (Military)
Kappa Psi (Pharmacy)	Semper Fidelis (Marine Corps ROTC)
Lambda Tau (Medical Technology)	Sigma Delta Chi (Journalism)
National Student Speech, Language, Hearing Association (Communication Disorders)	Sigma Gamma Epsilon (Earth Sciences)
Omicron Delta Epsilon (Economics)	Sigma Lambda Chi (Building Construction)
Omicron Kappa Pi (Architecture)	Sigma Theta Tau (Nursing)
	Sigma Xi (scientific research)
	Steering (Navy ROTC)
	Upsilon Pi Epsilon (computer science)

Sororities

Alpha Chi Omega	Delta Zeta
Alpha Delta Pi	Kappa Alpha Theta
Alpha Gamma Delta	Kappa Delta
Alpha Kappa Alpha	Kappa Kappa Gamma
Alpha Omicron Pi	Pi Mu
Alpha Xi Delta	Pi Beta Phi
Chi Omega	Sigma Kappa
Delta Delta Delta	Zeta Tau Alpha
Delta Sigma Theta	

The Panhellenic Council coordinates the activities of its member groups.

General Information

Social Fraternities

Alpha Gamma Rho
Alpha Phi Alpha
Alpha Psi (professional)
Alpha Tau Omega
Beta Theta Pi
Chi Phi
Delta Chi
Delta Sigma Phi
Delta Tau Delta
FarmHouse
Kappa Alpha Order
Kappa Alpha Psi
Kappa Sigma
Lambda Chi Alpha
Omega Tau Sigma (professional)
Omega Psi Phi

Phi Beta Sigma (Colony)
Phi Delta Theta
Phi Gamma Delta
Phi Kappa Tau
Pi Kappa Alpha
Pi Kappa Phi
Pi Lambda Phi (colony)
Sigma Alpha Epsilon
Sigma Chi
Sigma Nu
Sigma Phi Epsilon
Sigma Pi
Tau Kappa Epsilon
Theta Chi
Theta Xi

The Interfraternity Council coordinates the relationships among the member fraternities.

Recreational Services — The University offers a well rounded program of intramural athletics and provides a variety of facilities for recreation. Healthful sports, good sportsmanship, and friendly competition are stressed, and all students are urged to participate in recreational activities.

For additional information, consult the Recreational and Intramural Sports handbook which can be obtained at the Intramural Office, located on the second floor of the Student Activities Center.

Discipline — Auburn University establishes and enforces only those rules and regulations for conduct as are needed to maintain the well-being of the individual student and the University community. The student, in registering at the University, agrees to conform with its regulations. The student is subject to disciplinary action for violating any section of the Code of Student Discipline, which appears in full in the student handbook, *The Tiger Cub*. Enrollment in no way exempts any student from penalty in case of conviction by public authorities for commission of an illegal act.

Music, Theatre, and Lectures — Classical concerts, touring play productions, lectures by political figures, news commentators, specialists and prominent scholars, traveling and local shows at the art galleries, opera, ballet, and films are among the special events of the year at the University. Many of these activities are free.

The University Concert Choir, the Choral Union, University Singers, the Marching and Concert Bands, the University Orchestra and the Opera Workshop offer opportunities for those who want to perform in Musical groups.

Eight or nine productions each year are offered by the Auburn University Theatre. Students are welcome to audition for any production but priority in casting is given to theatre majors and minors.

The Auburn Studio of the Alabama Public Television Network produces programs which are seen throughout the state on the Alabama Educational Television network. WEGL-FM is the campus radio station, operated by students.

Related Programs and Activities

Cooperative Education Program

The Cooperative Education program provides opportunities for students to alternate quarters of academic study with quarters of experience in industry, education, business, and government agencies.

Coordination of study and work combines theory and practice. As a result students find increased meaning in and motivation for their studies. This experience helps to develop a sense of responsibility, judgment, and maturity. Students also benefit financially, since they are paid for their work.

In all four-year undergraduate curricula, the Cooperative Education Program is a five-year plan. A student must complete at least two quarters of the freshman year with an above average scholastic record before "being placed" with an employer. Cooperative Education is offered in all curricula of the Colleges of Agriculture, Business, Education, Engineering, Liberal Arts, and Sciences and Mathematics; in all curricula of the Schools of Forestry and Human Sciences; and Architecture, Building Science, and Industrial Design in the School of Architecture.

A graduate Co-op Program is arranged for certain students in the master's and doctoral programs where employers can provide professional experiences which relate directly to the student's specialized field of study.

Additional information may be secured from the Director, Cooperative Education, Auburn University, Alabama, 36849-5123.

Independent Study

The Independent Study program provides undergraduate and non-credit correspondence instruction for persons unable to attend college on a regular basis. Courses are also open to enrolled students with their dean's permission. The credit courses parallel those given in the University, award college credit, and are taught by faculty members. Any person is eligible for enrollment, although enrollment is not equivalent to admission to the University.

Upon registration the student receives a course manual and instructions. The student will be required to do assigned reading, submit written assignments, and do possible supplemental work. A supervised final examination is given upon completion of all course assignments.

Although graduate credit cannot be earned by correspondence, certain undergraduate deficiencies may be cleared.

Persons typically enroll in a correspondence course (1) when job or family responsibilities prevent on-campus study; (2) when classroom schedules conflict or a course is unavailable during the quarter it is needed; (3) when a person has been away from formal study for some time and wishes to get back in stride; (4) while at home during the summer break or when participating in a cooperative education program away from the campus.

Courses are available from the following fields: Biology, Economics, English, Geography, Health, Mathematics, Physical Education and Recreation, History, Nutrition and Foods, Political Science, Psychology, Rural Sociology, Sociology, Vocational and Adult Education.

Fees for correspondence courses are listed under Fees and Charges. See also Off-Campus Credit in the section on Academic Regulations. Application forms and a course bulletin are available from Independent Study, University Continuing Education, 100 Mell Hall, Auburn University, Alabama 36849-5611, Telephone: (205) 826-5103.

Special Clinics

The Speech and Hearing Clinic of the Department of Communication Disorders, primarily a teaching facility, provides service for students with speech, hearing or language problems. These services may involve both diagnoses and treatment of problems.

Bookstores

The Auburn University Bookstore, located in Haley Center, offers a full line of new and used textbooks and other instructional materials. Alpha Phi Omega service fraternity sponsors a nonprofit bookstore in the Foy Union Building where students may purchase and sell textbooks. Commercial book outlets also exist in the city of Auburn.

Vehicle Registration

Registration of vehicles, including bicycles, is a part of the enrollment procedure for all students at the beginning of Fall Quarter.

Students who bring unregistered vehicles, including bicycles, to campus after the Fall enrollment period must register them at once at the University Police department. Failure to register a vehicle, to use the proper decal, and to park in the proper zone will subject the operator to certain penalties.

Vehicles, excluding motorcycles and bicycles, of all students, excluding Graduate Teaching Assistants and Graduate Research Assistants, may not travel through, or park on, the main part of campus (as defined by Magnolia Avenue, College Street, Samford Avenue, and Donahue Drive) from 7:30 a.m. until 5 p.m., Monday through Friday. Vehicles belonging to freshmen are not allowed to park in Residential ("R" Zone) areas during the zone enforcement hours. Because of the parking situation on campus and in Auburn, students are not encouraged to bring automobiles unless absolutely required for commuting.

The regulations stated above are subject to modification by the beginning of the Fall Quarter. Specific and current information on parking areas, regulations, controls, commuting, violations, and penalties may be found in the "Auburn University Traffic and Parking Regulations," available at the University Police Department.



College of Agriculture

JAMES E. MARION, *Dean*
 R.A. VOITTE, *Associate Dean*
 W. J. ALVERSON JR., *Assistant Dean*
 R. DENNIS ROUSE, *Dean Emeritus*
 CHARLES F. SIMMONS, *Dean Emeritus*

THE COLLEGE OF AGRICULTURE prepares students for careers in agriculture and related professions. Courses provide a broad foundation in the basic sciences, a general knowledge of the applied sciences, and a reasonable number of cultural subjects. Most of the basic science courses are given in the freshman and sophomore years and serve as a basis for a better understanding of the applied or more practical subjects which are usually taken in the junior and senior years.

A curriculum is offered in Agricultural Business and Economics, Agricultural Journalism, Agricultural Science, Agronomy and Soils, Animal and Dairy Sciences, Entomology, Fisheries Management, General Horticulture, Integrated Pest Management, Landscape and Ornamental Horticulture, Poultry Science, and Rural Sociology. If students wish to major in a field where the courses are not prescribed in the catalog, they should consult with the Dean.

The College of Agriculture also furnishes the subject matter training in Agriculture for the curriculums of Agricultural Engineering and Agribusiness Education.

Transfer credit will not normally be allowed for any course passed with a grade lower than C at any other college or university.

Credit toward a degree in any curriculum in the College of Agriculture will not be allowed for a mathematics course at a level lower than that specified in the curriculum. However, students who are not prepared to take the prescribed courses may take lower level courses without degree credit.

Transfer credit for agricultural subjects not considered equivalent to those required in the chosen curriculum may be substituted for elective credit; however, duplication of credit will not be allowed. Equivalency of agricultural subjects will be determined by the Dean's Office; however, students may also obtain transfer credit on the basis of validating examinations. Arrangements for validating examinations must be made with the Dean of Agriculture in the first quarter of enrollment in the College of Agriculture at Auburn and the examinations must be completed before the middle of the second quarter. Transfer credit in lieu of courses that are considered to be upper division courses in substance at Auburn University will not be accepted from two-year colleges.

Pre-Veterinary Medicine

It is possible to gain admission to the College of Veterinary Medicine upon completion of the minimum requirements listed below. Students may declare an option upon admission to the College of Agriculture and must declare an option by the end of their freshman year. If students are admitted to the College of Veterinary Medicine after the completion of all the requirements in the first three years of the option, they may obtain a Bachelor of Science degree in the option after completion of the freshman year of the College of Veterinary Medicine.

The minimum requirements for admission to the College of Veterinary Medicine, Auburn University (112 quarter hours), are as follows and are incorporated in the first three years of the options listed under the following curricula: Animal and Dairy Sciences, Entomology and Poultry Science.

EH 101, 102, 103 9	BI 101, 103 10	ADS 200 5	PO 209 5
EH 141 3	CH 103, 104, 105 15	ADS 220 5	Humanities, Fine Arts, &
HY See Liberal Ed.	CH 207, 208 10	ADS 320 4	Social Sciences 15
	PS 205, 206, 207 12	MB 300 5	
		ZY 300 5	

See also the curriculum in Pre-Veterinary Medicine (PV), College of Sciences and Mathematics.

Dual Degree Program With Engineering

This program gives students the opportunity to receive two baccalaureate degrees — one in Agriculture and one in Engineering. Although the program was developed primarily for students desiring a combination of a Biological Sciences program with an Engineering program, it does not preclude the consideration of other Agriculture-Engineering combinations.

In general, students will be enrolled in the College of Agriculture for approximately three years and in the College of Engineering for approximately two years. During the first three years, the students should take those mathematics, physics, and chemistry courses necessary to allow them to transfer to the College of Engineering. Additionally, before transferring to the College of Engineering, they should have completed approximately three-fourths of the total hours required by the College of Agriculture for the awarding of the degree.

To become dual-degree candidates under this program, students must have grade point averages which indicate the likelihood of satisfactory completion of College of Engineering degree requirements and a recommendation from the Dean of the College of Agriculture. Recommendation should be sought one quarter before time of expected transfer to the College of Engineering.

It is also possible for very highly qualified students to transfer to the College of Engineering following the junior year with the intent of seeking a Master's Degree rather than a Bachelor's Degree in one of the Engineering disciplines. Consult the Engineering Dean's Office concerning this option.

Agricultural Business and Economics (AEC)

The curriculum in Agricultural Business and Economics is for students who plan a career in agriculture or closely related business; and for those interested in the economics of agricultural production, marketing, public policies affecting agriculture, and natural resources.

Optional career paths provide specialized training for students interested in agri-business and marketing, farm management, and natural resources. The curriculum combines business management and technical agricultural courses, and through selection of electives, it provides an opportunity for students to emphasize training in agribusiness aspects of other disciplines such as food science or selected production fields.

The demand for graduates who have both business and applied agricultural or natural resource training is increasing. In both public and private agencies, increasing attention to rural economic and social problems points to enlarged opportunities for qualified workers in farming, sales, public relations, services, extension, administration, and private employment in domestic and international arenas. By electing appropriate courses, Agricultural Business and Economics students can prepare for a wide variety of positions in the food industry, environmental management, and international economics as well as the traditional agricultural fields.

First Quarter			FRESHMAN YEAR			Third Quarter		
			Second Quarter					
MH	160	Pre-Cal w/Trig.....5	MH	161	An. Geom & Cal.....5	CH	104	Fund. Chem. II.....4
BI	101	Prin. of Biology.....5	CH	103	Fundamental Chem I...4	CH	104L	Chem. Lab.....1
EH	101	English Comp.....3	CH	103L	Chem. Lab.....1	BI	102	Plant Biology or.....5
HY	101	History*.....3	EH	102	English Comp.....3	BI	103	Animal Biology.....5
AEC	101	Intr. to Ag Econ.....1	HY	102	History*.....3	EH	103	English Comp.....3
		ROTC or Elective.....1			ROTC or Elective.....1	AEC	200	Ag. Econ. I.....5
								ROTC or Elective.....1
			SOPHOMORE YEAR					
PS	200	Fund Physics.....5	PO	209	Amer. Gov't.....5	MN	274	Statistics** or.....5
AEC	202	Ag Econ II.....5	MN	207	Intr. Comp Prog** or.....3	BST	215	Intr. Bio Stat.....5
HY	103	History*.....3	BST	216	Intr. Bio. Comprtr.....3	RSY	261	Intr. to Rural Soc.....5
SC	140	App. Speech Com.....3	ACF	211	Accounting I.....4	ACF	212	Accounting II.....4
AEC	210	Micro. Comprtr.....3	PH	201	Poultry Science or.....3			Electives.....3
		ROTC or Elective.....1	ADS	200	Intr. An. Sci.....5			ROTC or Elective.....1
					ROTC or Elective.....1			

JUNIOR YEAR

AY 307 Gen Soils	5	AY 200 Crop Production***	5	AN 351 Ag. Mach. Tech. I	5
AEC 301 Ag. Mktg.	5	ADS 220 Anim. Bio. & Nutr. or	5	EC 360 Money and Bank	5
EHA 304 Tech. Writing	3	ADS 320 Feeds & Feeding	4	Electives	5
Electives	3	AEC 307 Ag. Law	5		
		Electives	3		

SENIOR YEAR

AEC 510 Ag. Bus. Mgt	5	AEC 501 Farm Mgt	5	AEC 505 Ag. Policy	3
AEC 509 Resource Econ	5	AEC 503 Ag. Prices	3	Electives	13 or 15
EHA 415 Written Bus. Comm	3	AEC 490 Sen Seminar	1		
Electives	5	Electives	8		

TOTAL — 210 QUARTER HOURS

*HY 204, HY 205, HY 206 may be substituted.

**If MN 207 is taken, student must take MN 274.

***AY 301 or AY 401 may be substituted.

†AN 350, AN 352, AN 353, or AN 354 may be substituted.

Career Path Options. Undergraduate AEC majors may select one of three career paths, (I) Agribusiness and Marketing, (II) Farm Management, or (III) Natural Resource Economics, but are not required to do so. To concentrate studies in a career path option, a minimum of 20 hours are to be taken from the chosen option group of electives. If option not chosen, a minimum of 30 hours of recommended electives must be taken. A list of recommended electives is available in the offices of the adviser and Dean and must be approved by them.

AEC 399, Agricultural Business and Economics Internship. Up to 10 hours credit is available subject to arrangements with approved firms or businesses.

Agricultural Engineering (AN)

The Agricultural Engineering curriculum provides graduates with engineering skills necessary to serve the nation's largest industry — agriculture. In addition to a strong background in mathematics, physical sciences, and basic engineering fundamentals, agricultural engineering students receive training in biological agricultural sciences. Through technical electives in the senior year, one can specialize in one or more areas to include soil and water conservation, power and machinery design, electric power and processing, agricultural structures and environment, food engineering, and waste management, and agricultural pollution control.

The curriculum is coordinated by the College of Engineering and the College of Agriculture. Students register in Engineering and are assigned an academic adviser in Agricultural Engineering. Beginning students should apply for admission to the College of Engineering and complete the Pre-Agricultural Engineering program. For qualified agricultural students who develop an interest in Agricultural Engineering during their freshman year, an alternate course sequence for completion of the Pre-Agricultural Engineering program under the guidance of an Agricultural Engineering adviser is available in the College of Agriculture.

See the College of Engineering section for admission and degree requirements.

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
MH 161 An. Geom. & Cal.	5	MH 162 An. Geom. & Cal.	5	MH 163 An. Geom. & Cal.	5
CH 103 Fund. Chem. I	4	CH 104 Fund. Chem. II	4	PS 220 Gen. Physics I	3
CH 103L Gen. Chem. Lab.	1	CH 104L Gen. Chem. Lab.	1	PS 220L Gen. Physics Lab I	1
EH 101 English Comp	3	EH 102 English Comp	3	EH 103 English Comp	3
IE 102 Graph. Comm.	3	AN 101 Intr. to Ag. and For.	1	HY History Elective**	3
& Design	3	Engr. or elective	1	Fortran Programming	3
HY History Elective**	3	HY History Elective**	3		

SOPHOMORE YEAR

MH 264 An. Geom. & Cal.	5	MH 265 Diff. Equations	3	BI 101 Prin. of Biology	5
PS 221 Gen. Physics II	3	PS 222 Gen. Physics III	3	ME 301 Thermodynamics I	4
PS 221L Gen. Physics Lab II	1	PS 222L Gen. Physics Lab. III	1	ME 321 Dynamics I	4
AN 201 Engr. Prin. in Ag. & For.	5	EGR 207 Mech. Solids	3	MH Math Elective	3
EGR 205 Appl. Mech.-Statics	4	AEC 202 Ag. Economics II	5		
		Hum./Soc. Elective*	3		

JUNIOR YEAR

CE 310 Hydraulics I.....3	AN 311 Fund. of Mobile Equip. Design.....5	AN 313 Conser. & Water Mgt. Engr.....6
EE 302 Elec. Engr. I.....3	AN 315 Agric. Processing & Food Engineering.....5	AN 316 Elec. Systems in Agriculture.....5
EE 330 Anal. & Design of Logic Circuits.....4	EGR 420 Prof. Pract. Engr.....1	AN 317 Environment of Ag. Structures.....3
AY 307 General Soils.....5	EE 303 Intr. to Elec. Eng. II.....3	Technical Elective.....3
EHA 304 Technical Writing.....3	Tech. Elective.....3	

SENIOR YEAR

AN 403 App. Struc. Anal. & Design.....3	AN 430 Engr. Design for Bio. Systems I.....4	AN 530 Engr. Design for Bio. Systems II.....4
Ag. Elective.....5	IE 360 Engr. Economic Analysis.....3	Hum.-Soc. Elective*.....9
Technical Elective.....3	Ag. Elective.....5	Technical Elective.....4
Hum.-Soc. Elective*.....3	Technical Elective.....5	
AN 418 Waste Mgt. & Utilization Sys. ....4		

TOTAL — 210 QUARTER HOURS

*Selected from Anthropology, Art, Economics, History, Literature, Philosophy, Political Science, Psychology, Religion, Sociology, Theatre.

**Selected from Technology & Civilization HY 121, 122, 123, or World History HY 101, 102, 103.

A list of recommended electives is available in the offices of the adviser and Dean.

Electives must be approved by them.

Basic ROTC may be substituted for three hours of Humanistic-Social Science electives.

Advanced ROTC may be substituted for EH 304 (3 hrs) and three additional hours approved by the department head.

Agricultural Journalism (AJ)

The Agricultural Journalism major provides graduates with training in a wide range of agricultural courses and a strong background in journalism.

Virtually all large agricultural firms, plus scores of agricultural related magazine companies, publish printed material on a regular basis for the general public and/or members of their organization. Editors and writers of such publications often require a specialized knowledge of agricultural subject matter and terminology as well as the ability to practice the requirement of accurate and responsible journalism. Likewise, Cooperative Extension Services and Agricultural Research Information Departments hire a wide variety of agricultural journalism graduates.

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
BI 101 Prin. of Biology.....5	BI 102 Plant Biology.....5	BI 103 Animal Biology.....5			
MH 160 Pre-Cal. w/Trig.....5	MH 161 An. Geom. & Cal or	CH 103 Fund. Chem.....4			
EH 101 English Comp.....3	MH 151 Finite Math.....5	CH 103L Gen. Chem. Lab.....1			
HY History*.....3	EH 102 English Comp.....3	EH 103 English Comp.....3			
ROTC or Elective.....1	HY History*.....3	JM 101 Newspaper Style.....5			
	ROTC or Elective.....1	ROTC or Elective.....1			

SOPHOMORE YEAR

CH 104 Fund. Chem.....4	AEC 200 Agr. Econ. I.....5	ADS 205 Livestock Prom.....2
CH 104L Gen. Chem. Lab.....1	ADS 200 Int. to An. & Dairy Science.....5	ADS 220 An. Biochem. Nutr. or.....5
HY History*.....3	JM 313 Reporting**.....5	ADS 320 Feeds & Feeding.....4
JM 221 Begin. Newswrit.....5	JM 314 Copy & Editing.....3	PH 201 Poultry Science.....5
JM 204 or SC 204 — Intr. to Public Rel**.....5	ROTC or Elective.....1	SC 111 Public Speaking.....5
ROTC or Elective.....1		ROTC or Elective.....1

JUNIOR YEAR

AY 307 General Soils.....5	RSY 261 Rural Sociology.....5	JM 322 Feature Writ.....5
HF 202 Fruit & Veg. Prod.....5	AY 200 Crop Production.....5	SC 338 Broadcast News Writing.....5
JM 321 Newspaper Makeup and Layout.....5	JM 421 Photo-Jnlsm Elective.....3	AEC 301 Agr. Marketing.....5
Elective.....3		Elective.....3

SENIOR YEAR

ENT 502 Econ. Entomology5	JM 323 The Comm. Newspaper5	AEC 505 Agr. Policy3
JM 422 Jnlsm. Wkshp***3	JM 423 Jnlsm. Wkshp***3	Electives14 or 15
FY 350 Farm Forestry5	Electives3	
JM 485 Advanced Reporting3	BST 215 Intr. Bio. Stats5	

TOTAL — 210 QUARTER HOURS

The student will consult with his adviser concerning elective courses that should be taken. Lists of courses are available in the office of the adviser and Dean, and must be approved by them.

*Selected from one of the these sequences: HY 101-102-103; HY 204-205-206; EH 260-261-262; or AT 171-172-173.

**Typing is a pre-requisite for JM 221 and JM 313. Students who do not have the typing ability required should defer JM 204 or SC 204 until the junior year and elect VED 200, Typewriting I, in its place.

***JM 425, Journalism Internship may be substituted.

Agricultural Science (AG)**FRESHMAN YEAR**

First Quarter		Second Quarter		Third Quarter	
BI 101 Prin. of Biology5		BI 102 Plant Biology5		CH 104 Fund. Chem. & Lab5	
MH 160 Pre-Cal. W. Trig5		CH 103 Fund. Chem. & Lab5		MH 151 Finite Math or	
EH 101 English Composition3		EH 102 English Composition3		MH 161 An. Geom. & Calc5	
HY 101 World History3		HY 102 World History3		EH 103 English Composition3	
ROTC or Elective1		ROTC or Elective1		HY 103 World History3	
				ROTC or Elective1	

SOPHOMORE YEAR

ADS 200 Intr. An. & Dairy Sciences5	AEC 200 Agr. Economics I5	ADS 220 An. Biochem. & Nut5
BI 103 Animal Biology5	AY 301 Prin. Grain Prod.5	HF 201 Orchard Mgt.5
PS 200 Fnds. of Physics5	CH 207 Org. Chem. & Lab. or	Elective5
ROTC or Elective1	CH 203 Org. Chem5	ROTC or Elective1
Elective1	ROTC or Elective1	Elective1
	Elective1	

JUNIOR YEAR

PH 201 Poultry Science5	BY 306 Fund. Plant Phys.5	AY 304 General Soils5
SC 140 App. Sp. Comm.3	PLP 309 Gen. Plant Path.5	HF 308 Veg. Crops5
Ag. Eng. Elective*5	JM 315 Technical Journalism3	Ag. Eng. Elective*5
Elective5	Elective5	Elective3

SENIOR YEAR

AY 401 Prin. Forage Prod.5	AEC 301 Ag. Marketing5	ADS Elective**5
FY 350 Farm Forestry5	AY 404 Fiber & Oil Crops5	AEC 501 Farm Management5
Electives8	Electives8	ENT 502 Econ. Entomology5
		Elective3

TOTAL — 210 QUARTER HOURS

*To be selected from AN 350, 351, 352, 353, and 354.

**May be selected from ADS 401, 403 or 407.

A list of the recommended electives is available with the adviser and Dean and must be approved by them.

Agronomy and Soils (AY)

Courses are designed to prepare Agronomy graduates for several major areas of endeavor:

- (1) the chemical industry, producers of fertilizers, herbicides, and other agricultural chemicals;
- (2) farm-advisory agencies such as soil testing laboratories and other private consultants;
- (3) public farm-advisory agencies such as the Agricultural Extension Service or the Soil Conservation Service;
- (4) Research agencies of corporations, U.S. Department of Agriculture, colleges and universities, and State Agricultural Experiment Stations;
- (5) turfgrass industry;
- (6) farming.

Four undergraduate options are available to students in Agronomy and Soils. They are (1) Science Option, for those who plan to pursue graduate work, (2) Production Option, (3) Business Option, and (4) Turf Management Option.

FRESHMAN YEAR					
First Quarter		Second Quarter		Third Quarter	
CH	103 Gen. Chem.	4	BI	101 Prin. of Biology	5
CH	103L Gen. Chem. Lab.	1	CH	104 Gen. Chem.	4
MH	160 Pre-Cal. w/Trig.	5	CH	104L Gen. Chem. Lab.	1
AY	200 Crop Prod.	5	EH	101 English Comp.	3
	Elective*	1	HY	101 History	3
	ROTC or Elective*	1		ROTC or Elective	1
SOPHOMORE YEAR					
GL	110 Geology	5	BI	103 Animal Biology or	5
CH	207 Org. Chem.	4	ADS	220 An. Biochem. & Nutr.	5
CH	207L Org. Chem. Lab. 1 or		AY	301 Prin. of Grain Prod.**	5
CH	203 Org. Chem.	5	MB	300 Gen. Microbiol.	5
EH	103 English Comp.	3		ROTC or Elective	1
HY	103 History	3		Elective	1
	ROTC or Elective	1			
JUNIOR YEAR					
AY	312 Prin. of Weed Sci.	5	SC	140 Appl. Speech	3
BY	306 Fund. Plant Phys.	5	ZY	300 Genetics	5
	Electives	8		Electives	10
SENIOR YEAR					
ENT	502 Econ. Entomol.	5	ADS	200 Int. An. & Dairy Sci.***	5
EHA	304 Tech. Writing or		BST	216 Intr. Biol. Comp.	3
EHA	415 Writt. Bus. Com.	3		Electives	10
	Electives	10	AY	502 Soil Fertility	5
				Electives	13 or 14

TOTAL — 210 QUARTER HOURS

*May choose an elective from Humanities and Fine Arts, and Social Sciences.

**Students in Turf will take AY 315.

***Not required in Turf option.

The student will consult with his adviser concerning the option and elective courses that should be taken. Lists of courses are available in the offices of the adviser and Dean, and must be approved by them.

Animal and Dairy Sciences (ADS)

Two curriculum options are available within the ADS Department to accommodate students with varied career goals and prepare them for leadership careers in livestock and related industries. The Production/Agribusiness/Extension option offers students flexibility in designing a custom-made program by selection of professional electives. Upon completion of this option, graduates should be qualified for career opportunities in livestock production, journalism, extension, livestock feed/nutrition, pharmaceutical industry, sales and merchandising, agricultural finance, governmental and private agencies, and industries related to the processing of meat products.

Contemporary animal agriculture is expanding into a "high tech" era which needs graduates with basic science backgrounds to aid in discovery and development of new concepts for animal production. The Pre-veterinary/Basic-Science (ADPV) option provides students with a foundation in biological and physical science necessary for entry into graduate programs in biotechnology and related disciplines while satisfying prerequisites for veterinary school. Postgraduate studies are necessary for most positions in teaching, extension and research at universities and allied animal industries, as well as areas of biotechnology.

Production/Agribusiness/Extension Option (ADS)

FRESHMAN YEAR											
First Quarter				Second Quarter				Third Quarter			
BI	101	Prin. Biol.	5	CH	103	Fund. of Chem. I	4	CH	104	Fund. of Chem. II	4
EH	101	English Comp.	3	CH	103L	Chem. Lab.	1	CH	104L	Chem. Lab.	1
ADS	200	Int. An. & Dairy Sci.	5	MH		Mathematics Req.1	5	MH		Mathematics Req.1	5
ADS	110	Orient. to Anim. &		HY	102	World History	3	HY	103	World History	3
		Dairy Science	1	EH	102	English Comp.	3	EH	103	English Comp.	3
HY		Requirement*	3			ROTC or Elective	1			ROTC or Elective	1
		ROTC or Elective	1			Elective	1			Elective	1
		Elective	1								

SOPHOMORE YEAR

CH 203 Organic Chem. or	PS 200 Fund of Physics	AEC 200 Agr. Economics
CH 207 Organic Chem.	MB 300 Gen. Microbiol.	ZY 300 Genetics
CH 207L Organic Chem. Lab	ADS 260 Growth & Body	SC 111 Public Speaking
ADS 220 An. Biochem. & Nutr.	Comp.	Fine Arts Elective
BI 103 Animal Biol.	Elective	ROTC or Elective
Elective	ROTC or Elective	
ROTC or Elective		

JUNIOR YEAR

ADS 320 Feeds & Feeding	ADS 350 Animal Breeding	ADS 361 Repro Physiol.
ZY 316 Physiol. Dom. Anim.	ADS 370 Meat Science	Communications
AY 304 Soils	Elective	Req.**
Prof. Elective††	Prof. Elective††	Undergrad Sem.
		AY 301 Grains or
		AY 401 Forage Production
		Prof. Elective††

SENIOR YEAR

AEC 501 Farm Mgt.	ADS Production Req.***	Prof. Elective††
ADS Production Req.**	Prof. Elective††	
Prof. Elective††		

TOTAL — 210 QUARTER HOURS

*World History 101-102-103 (3-3-3) or Technology & Civilization 204-205-206 (3-3-3) or World Literature (EH) 260-261-262 (3-3-3) or Art History 171-172-173 (3-3-3).

**EHA 304 (3), EHA 315 (3) or SC 511 (5).

***A minimum of 10 hrs. from ADS 401 (5), ADS 403 (5), ADS 405 (5), and ADS 407 (5).

†10 cr total with 5 cr from MH 140 or 160 and 5 cr from MH 151, 161 or BST 215.

††A minimum of 45 credit hrs. must be taken from the list of electives for one of the suggested options that is available in the offices of the adviser and the dean and must be approved by them.

Pre-Veterinary Medicine/Basic Science Option (ADPV)

The curriculum listed in the first nine quarters (161 quarter hours) will satisfy the minimum requirements for admission to the College of Veterinary Medicine. Satisfactory completion of the remaining requirements of the Animal-Dairy Science curriculum or completion of one year in the Veterinary Medicine curriculum entitles the student to the B.S. degree in Animal and Dairy Sciences.

FRESHMAN YEAR

First Quarter			Second Quarter			Third Quarter		
CH 103 Fund. of Chem.	CH 104 Fund. of Chem.	CH 105 Fund. of Chem.	CH 103L Chem. Lab.	CH 104L Chem. Lab.	CH 105L Chem. Lab.	MH 103 World History	MH 104 World History	MH 105 World History
CH 103L Chem. Lab.	CH 104L Chem. Lab.	CH 105L Chem. Lab.	CH 103L Chem. Lab.	CH 104L Chem. Lab.	CH 105L Chem. Lab.	EH 103 English Comp.	EH 104 English Comp.	EH 105 English Comp.
ADS 200 Int. An. & Dairy Sci.	HY 102 World History	HY 103 World History	MH 102 Mathematics Req.1	EH 102 English Comp.	EH 103 English Comp.	ROTC or Elective	ROTC or Elective	ROTC or Elective
HY 101 World History	EH 102 English Comp.	EH 103 English Comp.	ROTC or Elective	Elective	Elective	Elective	Elective	Elective
EH 101 English Comp.	Elective	Elective						
ADS 110 Orient. to ADS								

SOPHOMORE YEAR

BI 101 Prin. Biology	BI 103 Animal Biology	AEC 200 Agr. Economics
CH 207 Org. Chemistry	CH 208 Org. Chemistry	ZY 316 Physiol. Dom.
CH 207L Org. Chem. Lab	CH 208L Org. Chem. Lab	Anim.
ADS 260 Growth & Body	ADS 220 Anim. Biochem. & Nutr.	PS 205 Intr. Physics I
Comp.	Nutr.	PS 205L Physics Lab
ROTC or Elective	EH 141 Med. Vocab.	EHA 304 Technical Writing
	ROTC or Elective	ROTC or Elective

JUNIOR YEAR

PS 206 Intr. Physics II	ADS 361 Reproductive Physiol.	ADS 350 Animal Breeding
PS 206L Physics Lab	AY 304 General Soils	PO 209 American Govt.
MB 300 Microbiology	PS 207 Intr. Physics III	ADS 380 Undergrad. Seminar
ZY 300 Genetics	PS 207L Intr. Physics Lab	Elective
ADS 370 Meat Science	ADS 320 Feeds & Feeding	

SENIOR YEAR

SC	111	Public Speak	5	AEC	501	Farm Mgt.	5	AY	401	Forage Prod*	5
ADS		Prod. Req**	5	ADS		Prod. Req.**	5			Prof. Elective††	12
		Prof. Elective††	5			Prof. Elective††	7				

TOTAL — 210 QUARTER HOURS

*AY 401 (5) or AY 301 (5).

**A minimum of 10 hrs. from ADS 401 (5), ADS 403 (5), ADS 405 (5) and ADS 407 (5).

††0 cr total with 5 cr from MH 140 or 160 and 5 cr from MH 151, 161, or BST 215.

††A minimum of 24 hrs. must be taken from the list of electives for the ADPV option available in the office of the adviser and dean and must be approved by them.

Entomology

Entomology curricula prepare students for many productive careers in agriculture and the natural sciences. The Entomology curriculum is designed for those students interested in basic science, toxicology or systematic entomology. For students interested in agricultural entomology or integrated pest management the IPM curriculum gives good balance between applied and basic courses. The pre-vet option is offered for those students who wish to combine studies in entomology with pre-veterinary medicine.

Entomology (ENT)

FRESHMAN YEAR

First Quarter

BI	101	Prin. Biology	5
CH	103	Fund. Chem. I	4
CH	103L	Gen. Chem. Lab.	1
MH	160	Pre-Cal. w/Trig.	5
		Elective	1

Second Quarter

BI	102	Plant Biology	5
CH	104	Fund. Chem. II	4
CH	104L	Gen. Chem. Lab.	1
MH	161	An. Geom. & Cal.	5
		Elective	1

Third Quarter

BI	103	Animal Biology	5
MH	162	An. Geom. & Cal.	5
AEC	200	Ag. Econ. I	5
HY	101	World History	3
		Elective	1

SOPHOMORE YEAR

PS	205	Intr. Phys. & Lab. I	4
ZY	300	Genetics	5
EH	101	English Comp.	3
HY	102	World History	3
		Elective	1

PS	206	Intr. Phys. & Lab. II	4
CH	207	Organic Chem.	4
CH	207L	Org. Chem. Lab.	1
EH	102	English Comp.	3
HY	103	World History	3
		Elective	1

PS	207	Intr. Phys. & Lab. III	4
CH	208	Organic Chem.	3
CH	208L	Org. Chem. Lab.	2
ENT	304	Gen. Entomol.	5
EH	103	English Comp.	3
		Elective	1

JUNIOR YEAR

ZY	306	Prin. of Ecol.	5
EH	390	Adv. Comp. or	
SC	111	Public Speaking	5
ZY	301	Comp. Anatomy	5
		Electives	3

ZY	303	Syst. & Evol.	5
		Entomology Elective	5
		Electives	8

		Entomology Elective	5
ZY	310	Cell Biology	4
ZY	310L	Cell Biology Lab.	2
		Electives	8

SENIOR YEAR

MB	300	Gen. Microbiol.	5
ZY	511	Gen. Parasitol.	5
ZY	402	Natl. Hist. Vert.	5
		Electives	3

ZY	401	Invert. Zoology	5
ZY	524	An. Physiol.	5
		Electives	8

BY	506	Syst. Botany	5
ENT	405	Appl. Entomol.	5
		Electives	8

TOTAL — 210 QUARTER HOURS

Electives must be approved by adviser and will include at least 17 hours of humanities and social sciences and 21 hours of group electives selected from a list available from the adviser or Dean. At least 5 hours of group electives must be selected from the following: BY 306, 309, 509, 513, 515 and 516. Entomology electives to be selected with consent of adviser.

Entomology Pre-Vet Option (ENPV)

FRESHMAN YEAR

First Quarter

BI	101	Prin. Biology	5
CH	103	Fund. Chem. I	4
CH	103L	Gen. Chem. Lab.	1
MH	160	Pre-Cal. w/Trig.	5
		Elective	1

Second Quarter

BI	102	Plant Biology	5
CH	104	Fund. Chem. II	4
CH	104L	Gen. Chem. Lab.	1
MH	161	An. Geom. & Cal.	5
		Elective	1

Third Quarter

BI	103	Animal Biology	5
CH	105	Fund. Chem. III	4
CH	105L	Gen. Chem. Lab.	1
ADS	200	Intr. An. & Dairy Sci.	5
		Electives	2

SOPHOMORE YEAR

HY 101 World History.....3	HY 102 World History.....3	HY 103 World History.....3
EH 101 English Comp.....3	EH 102 English Comp.....3	EH 103 English Comp.....3
CH 207 Org. Chem.....4	PS 206 Intr. Phys. & Lab. II.....4	PO 209 American Govt.....5
CH 207L Org. Chem. Lab.....1	CH 208 Organic Chem.....3	PS 207 Intr. Phys. & Lab. III.....4
PS 205 Intr. Phys. & Lab. I.....4	CH 208L Org. Chem. Lab.....2	Electives.....2
Electives.....2	EH 141 Med. Vocabulary.....3	
	Elective.....1	

JUNIOR YEAR

ZY 300 Genetics.....5	ZY 303 Syst. & Evol.....5	ZY 306 Prin. of Ecol.....5
MB 300 Gen. Microbiol.....5	AEC 200 Ag. Econ. I.....5	ENT 404 Insects Aff. Man & Animals.....5
EHA 304 Tech. Writing.....3	ADS 220 An. Biochem.....5	ADS 320 Feeds & Feeding.....4
ENT 304 Gen. Entomol.....5	ENT Elective.....5	ENT Elective.....5

In the event the first-year Veterinary College alternative is not followed, the following must be completed successfully to receive the B.S. degree in Entomology. Entomology electives to be selected with consent of adviser.

SC 111 Public Speaking or	ZY 511 Gen. Parasitology.....5
EH 390 Adv. Eng. Comp.....5	ZY 402 Nat'l Hist. Vert.....5
ZY 301 Comp. Anatomy.....5	ZY 524 Gen. An. Physiol.....5
ZY 310 Cell Biol. & Lab.....6	BY 506 Syst. Botany.....5
ZY 401 Invert. Zoology.....5	Botany Elective*.....5
MH 162 An. Geom. & Cal.....5	

TOTAL — 210 QUARTER HOURS

*Acceptable are BY 306, 309, 509, 513, 515 and 516.

Fisheries and Allied Aquacultures

The curricula in Fisheries and Allied Aquacultures have both Science and Production Options that prepare students for careers in sport fish management, aquatic ecology, and aquaculture.

Fisheries Management (FAA)**SCIENCE OPTION**

Curriculum for students who intend to pursue graduate training.

First Quarter

BI 101 Prin. Biology.....5
CH 103 Fund. Chem. I.....4
CH 103L Gen. Chem. Lab.....1
MH 160 Pre. Cal. w/Trig.....5
PE Swimming.....2

FRESHMAN YEAR**Second Quarter**

BI 102 Plant Biology.....5
CH 104 Fund. Chem. II.....4
CH 104L Gen. Chem. Lab.....1
MH 161 An. Geom. & Cal.....5
Elective.....2

Third Quarter

BI 103 Animal Biology.....5
PS 205 Intr. Physics.....3
PS 205L Intr. Physics Lab.....1
AEC 200 Ag. Econ. I.....5
Elective.....2

PS 206 Intr. Physics.....3	ZY 251 Physiology.....5	CH 208 Organic Chem.....3
PS 206L Intr. Physics Lab.....1	CH 207 Organic Chem.....4	CH 208L Org. Chem. Lab.....2
ZY 300 Genetics.....5	CH 207L Org. Chem. Lab.....1	ZY 306 Prin. of Ecol.....5
EH 101 English Comp.....3	EH 102 English Comp.....3	EH 103 English Comp.....3
HY Requirement*.....3	HY Requirement*.....3	HY Requirement*.....3
Elective.....1	Elective.....1	Elective.....1

JUNIOR YEAR

55 hours to be arranged in consultation with adviser.

SENIOR YEAR

55 hours to be arranged in consultation with adviser.

TOTAL — 210 QUARTER HOURS

*World History 101-102-103 (3-3-3) or Technology and Civilization 204-205-206 (3-3-3) or World Literature (EH) 260-261-262 (3-3-3)

Additional Courses to be taken:

EH 390 Adv. Composition	5	and	
or		BST 216 Intr. Bio. Computations	3
SC 140 Appl. Speech Comm.	3	or	
ENT 304 Gen. Entomology	5	BST 501 Biological Statistics	5
ZY 401 Invert. Zoo	5	FAA 393 Fish. Seminar	1
MB 300 Gen. Microbiology	5	FAA 401 Limnology	5
BST 215 Intr. Bio. Stats.	5		

The remaining requirements will include a minimum of 15 hours selected from the humanities and social sciences and at least 35 hours of group electives selected from the list available with the adviser and Dean and must be approved by them.

Fisheries Management (FAA) PRODUCTION OPTION

Curriculum for students who intend to pursue careers in fish farming, hatchery management or sport fish management without graduate training.

First Quarter			FRESHMAN YEAR			Second Quarter			Third Quarter		
BI 101 Prin. Biology		5	BI 102 Plant Biology		5	BI 103 Animal Biology		5	CH 203 Organic Chem. or		
MH 140 College Algebra or			MH 151 Finite Math or			CH 207 Organic Chem.		4	CH 207L Org. Chem. Lab.		1
MH 160 Pre. Cal. w/Trig.		5	MH 161 An. Geom. & Cal.		5	CH 103 English Comp.		3	EH 103 English Comp.		3
CH 103 Fund. Chem. I		4	CH 104 Fund. Chem. II		4	PE Swimming		2	Elective		1
CH 103L Gen. Chem. Lab.		1	CH 104L Gen. Chem. Lab.		1						
EH 101 English Comp.		3	EH 102 English Comp.		3						
SOPHOMORE YEAR											
HY Requirement*		3	MB 300 Gen. Microbiology		5	SC 140 Appl. Sp. Comm.		3			
AEC 200 Ag. Econ.		5	HY Requirement*		3	HY Requirement*		3			
ADS 220 An. Biochem. &			PS 200 Fund. of Physics or		5	AY 304 General Soils		5			
Nutrition		5	PS 205 Intr. to Physics		4	Elective		5			
Elective		3-5	Elective		3 or 4						

JUNIOR YEAR

54 hours to be arranged in consultation with adviser.

SENIOR YEAR

53 hours to be arranged in consultation with adviser.

TOTAL — 210 QUARTER HOURS

*World History 101-102-103 (3-3-3) or Technology and Civilization 204-205-206 (3-3-3) or World Literature (EH) 260-261-262 (3-3-3).

Additional Courses to be taken:

FAA 393 Fisheries Seminar	1	FAA 401 Limnology	5
AEC 501 Farm Mgt.	5	ZY 306 Prin. of Ecol.	5
AN 352 Tractor and Eng. Tech.	5		

The remaining requirements will include a minimum of 15 hours selected from the humanities and social sciences and at least 35 hours of group electives selected from the list that is available in the offices of the adviser and Dean and must be approved by them.

Horticulture (HF)

Courses are designed to prepare Horticulture graduates for the following careers: nursery manager, landscape designer, landscape installer, landscape maintenance, interior landscaping, plant propagator, city or state horticulturist, extension horticulturist, horticulture writer, horticulture teacher, florist shop manager, greenhouse manager, vegetable producer, orchard manager, chemical company representative, seed company representative.

Five undergraduate options are available to students in Horticulture: Landscape Design, Nursery Crop Production, Fruit and Vegetable Crop Production, Florist Crop Production, and Retail Flower Shop Management.

Horticulture also offers a masters degree which leads to professional positions in teaching, research, and extension.

Florist Crop Production Option

This option provides professional and basic knowledge and develops basic skills in Florist Crop Production, preparing students for careers in the production of greenhouse grown crops.

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
BI	101 Prin. Biology.....5	BI	102 Plant Biology.....5	CH	104 Fund. Chem. & Lab.....5
MH	160 Pre-Cal. w/Trig.....5	CH	103 Fund. Chem. & Lab.*.....5	MH	161 An. Geom. & Cal. or
EH	101 English Comp.....3	EH	102 English Comp.....3	MH	151 Finite Math.....5
HF	101 Intr. Hort.....3	HY	101 World History.....3	EH	103 English Comp.....3
	ROTC or Elective.....1		ROTC or Elective.....1	HY	102 World History.....3
	Elective.....1		Elective.....1		ROTC or Elective.....1
					Elective.....1

SOPHOMORE YEAR

AEC	210 Micro. Comptr. or	AEC	200 Ag. Economics I.....5	CH	207 Org. Chem. & Lab or
BST	216 Intr. Bio. Comptr.....3		Hum.-Soc. Elective**.....5	CH	203 Org. Chem.....5
HF	224 Plant Propagation.....5		ROTC or Elective.....1	HF	221 Landscape
SC	111 Public Speaking.....5		Electives.....5		Gardening.....5
HY	103 World History.....3				ROTC or Elective.....1
	ROTC or Elective.....1				Electives.....5

JUNIOR YEAR

HF	323 Gen. Envir. Cont.....5	AY	304 Gen. Soils.....5	HF	410 Herb. Orn.....5
BY	306 Plant Phy.....5	PLP	309 Plant Path.....5	MT	241 Bus. Law or
EHA	304 Tech. Writing or		Elective.....8	MT	255 Leg. & Soc. Envir.
EHA	315 Bus. & Prof. Rpt. Wri. or				of Bus.....4
EHA	415 Writ. Bus. Comm.....3			HF	225 Flow. Arrang.....3
ACF	211 Prin. of Acct.....4			HF	308 Veg. Crops.....5
					Elective.....1

SENIOR YEAR

ENT	502 Econ. Ent.....5	AY	502 Soil Fert. or	BY	506 Syst. Bot.....5
MT	310 Prin. of Mgt.....4	AY	506 Fert. & Soil Test.....5	HF	522 Flor. Crop Prod.....5
	Elective.....9	HF	425 Flower Shop Mgt.....5		Elective.....8
		ZY	300 Genetics.....5		
			Elective.....3		

TOTAL — 210 QUARTER HOURS

Fruit and Vegetable Option

This option is designed to prepare the student for a future in the fruit or vegetable industry.

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
BI	101 Prin. of Biology.....5	BI	102 Plant Biology.....5	CH	104 Fund. Chem.
MH	160 Pre-Cal. w. Trig.....5	EH	102 English Comp.....3		& Lab.....5
EH	101 English Comp.....3	HY	101 World History.....3	MH	161 An. Geom. & Cal. or
HF	101 Intr. to Hort.....3	CH	103 Fund. Chem.	MH	151 Finite Math.....5
	ROTC or Elective.....1		& Lab.....5	EH	103 English Comp.....3
	Elective.....1		ROTC or Elective.....1	HY	102 World History.....3
			Elective.....1		ROTC or Elective.....1
					Elective.....1

SOPHOMORE YEAR

HF	224 Plant Propagation.....5	AEC	210 Micro. Comptr. or	GL	110 Physical Geo.....5
HF	221 Landscape Garden.....5	BST	216 Intr. Bio. Comptr.....3	HF	201 Orchard Mgt.....5
SC	111 Public Speaking.....5	AEC	200 Ag. Economics I.....5	PS	200 Fnds. of Physics.....5
HY	103 World History.....3	CH	207 Org. Chem. & Lab. or		ROTC or Elective.....1
	ROTC or Elective.....1	CH	203 Organic Chem.....5		
		JM	315 Tech. Journalism.....3		
			ROTC or Elective.....1		

College of Agriculture

JUNIOR YEAR

AN	350	Soil and Water Technology.....5	AEC	301	Ag. Marketing.....5	AY	502	Soil Fertility.....5
BY	306	Fund. of Plant Physiology.....5	HF	308	Vegetable Crops.....5	PLP	309	Plant Pathology.....5
		Electives.....8	AY	304	General Soils.....5	ZY	300	Genetics.....5
					Elective.....3			Elective.....3

SENIOR YEAR

AEC	501	Farm Management.....5	HF		Elective*.....5	HF	501	Com. Veg. Crops.....5
AY	312	Weed Sci.....5			Agri. Engineering.....5	ENT	502	Economic Entomol.....5
		Elective.....6			Elective.....5	HF		Elective*.....5
					Elective.....6			Elective.....3

TOTAL — 210 QUARTER HOURS

*Students are required to take two of the following Horticulture electives: HF 504, Fruit Growing; HF 505, Small Fruits; HF 506, Nut Culture.

Landscape Design Option

This option provides professional and basic knowledge and develops basic skills in Landscape Design, preparing the student for a career in landscape design and/or landscape installation and/or landscape maintenance.

First Quarter

BI	101	Prin. Biology.....5
MH	160	Pre. Cal. w/Trig.....5
EH	101	English Comp.....3
HF	101	Intr. Hort.....3
		ROTC or Elective.....1
		Elective.....1

FRESHMAN YEAR

Second Quarter

BI	102	Plant Biology.....5
CH	103	Fund. Chem. & Lab.*.....5
EH	102	English Comp.....3
HY	101	World History.....3
		ROTC or Elective.....1
		Elective.....1

Third Quarter

CH	104	Fund. Chem. & Lab.....5
MH	161	An. Geom. & Cal. or.....5
MH	151	Finite Math.....5
EH	103	English Comp.....3
HY	102	World History.....3
		ROTC or Elective.....1
		Elective.....1

SOPHOMORE YEAR

AEC	210	Micro. Comptr. or.....5
BST	216	Intr. Bio. Comptr.....3
HF	224	Plant Propagation.....5
SC	111	Public Speaking.....5
HY	103	World History.....3
		ROTC or Elective.....1

AEC	200	Ag. Economics I.....5
		Hum.-Soc. Elective**.....5
		ROTC or Elective.....1
		Electives.....5

CH	207	Org. Chem. & Lab or.....5
CH	203	Org. Chem.....5
HF	221	Landscape Gardening.....5
		ROTC or Elective.....1
		Electives.....5

JUNIOR YEAR

HF	323	Gen. Envir. Cont.....5
BY	306	Plant Phy.....5
EHA	304	Tech. Writing or.....5
EHA	315	Bus. & Prof. Rpt. Wri. or.....5
EHA	415	Writ. Bus. Comm.....3
HF	222	Trees.....5

AY	304	Gen. Soils.....5
PLP	309	Plant Path.....5
HF	223	Ever. Shrubs & Vines.....5
		Elective.....3

HF	410	Herb. Orn.....5
MT	241	Bus. Law or.....5
MT	255	Leg. & Soc. Envir. of Bus.....4
HF	321	Dec. Shrubs & Vines.....5
		Elective.....4

SENIOR YEAR

ENT	502	Econ. Ent.....5
AY	315	Turfgrass Mgt.....5
HF	427	Inter. Landscp. Des.....5
		Elective.....3

AY	502	Soil Fert. or.....5
AY	506	Fert. & Soil Test.....5
HF	523	Nurs. Mgt. or.....5
LA	341	Land. Const. or.....5
AN	350	Soil & Water Tech. or.....5
GL	101	Intr. to Gwo.....5
		Elective.....10

BY	506	Syst. Bot.....5
HF	428	Adv. Land. Des.....5
		Elective.....5

TOTAL — 210 QUARTER HOURS

Nursery Crop Production Option

This option provides professional and basic knowledge and develops basic skills in Nursery Production, preparing students for careers in all facets of the nursery industry.

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
BI	101 Prin. Biology.....5	BI	102 Plant Biology.....5	CH	104 Fund. Chem. & Lab. ....5
MH	160 Pre. Cal. w/Trig.....5	CH	103 Fund. Chem. & Lab.* ....5	MH	161 An. Geom. & Cal. or
EH	101 English Comp. ....3	EH	102 English Comp. ....3	MH	151 Finite Math.....5
HF	101 Intr. Hort. ....3	HY	101 World History.....3	EH	103 English Comp. ....3
	ROTC or Elective.....1		ROTC or Elective.....1	HY	102 World History.....3
	Elective.....1		Elective.....1		ROTC or Elective.....1
					Elective.....1

SOPHOMORE YEAR

AEC	210 Micro. Comptr. or	AEC	200 Ag. Economics I.....5	CH	207 Org. Chem. & Lab or
BST	216 Intr. Bio. Comptr. ....3		Hum.-Soc. Elective** ....5	CH	203 Org. Chem. ....5
HF	224 Plant Propagation ....5		ROTC or Elective.....1	HF	221 Landscape
SC	111 Public Speaking ....5		Electives.....5		Gardening.....5
HY	103 World History.....3				ROTC or Elective.....1
	ROTC or Elective.....1				Electives.....5

JUNIOR YEAR

HF	323 Gen. Envir. Cont. ....5	AY	304 Gen. Soils.....5	HF	410 Herb. Orn. ....5
BY	306 Plant Phy. ....5	PLP	309 Plant Path. ....5	AC	211 Prin. or Acct. or
EHA	304 Tech. Writing or	HF	223 Ever. Shrubs & Vines* ....5	MT	241 Bus. Law or
EHA	315 Bus. & Prof. Rpt. Wri. or		Elective.....3	MT	255 Leg. & Soc. Envir.
EHA	415 Writ. Bus. Comm. ....3				of Bus. ....4
HF	222 Trees*.....5			HF	321 Dec. Shrubs & Vines* ....5
	Elective.....5				Elective.....4

SENIOR YEAR

ENT	502 Econ. Ent. ....5	AY	502 Soil Fert. or	BY	506 Syst. Bot. ....5
AY	315 Turfgrass Mgt. ....5	AY	506 Fert. & Soil Test. ....5		Elective.....10
HF	201 Orchard Mgt. ....5	ZY	300 Genetics.....5		
	Elective.....3	HF	521 Care & Maint. ....5		
		HF	523 Nursery Mgt. ....5		

TOTAL — 210 QUARTER HOURS

*Two courses out of these three must be taken.

Retail Flower Shop Management Option

This option provides professional and basic knowledge and develops basic skills in Retail Flower Shop Management, preparing students for careers as florists.

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
BI	101 Prin. Biology.....5	BI	102 Plant Biology.....5	CH	104 Fund. Chem. & Lab. ....5
MH	160 Pre. Cal. w/Trig.....5	CH	103 Fund. Chem. & Lab.* ....5	MH	161 An. Geom. & Cal. or
EH	101 English Comp. ....3	EH	102 English Comp. ....3	MH	151 Finite Math.....5
HF	101 Intr. Hort. ....3	HY	101 World History.....3	EH	103 English Comp. ....3
	ROTC or Elective.....1		ROTC or Elective.....1	HY	102 World History.....3
	Elective.....1		Elective.....1		ROTC or Elective.....1
					Elective.....1

SOPHOMORE YEAR

AEC	210 Micro. Comptr. or	AEC	200 Ag. Economics I.....5	CH	207 Org. Chem. & Lab or
BST	216 Intr. Bio. Comptr. ....3		Hum.-Soc. Elective** ....5	CH	203 Org. Chem. ....5
HF	224 Plant Propagation ....5		ROTC or Elective.....1	HF	221 Landscape
SC	111 Public Speaking ....5		Electives.....5		Gardening.....5
HY	103 World History.....3				ROTC or Elective.....1
	ROTC or Elective.....1				Electives.....5

JUNIOR YEAR

HF	323 Gen. Envir. Cont. ....5	AY	304 Gen. Soils.....5	HF	410 Herb. Orn. ....5
BY	306 Plant Phy. ....5	PLP	309 Plant Path. ....5	MT	241 Bus. Law or
EHA	304 Tech. Writing or	ACF	211 Prin. of Acct. ....4	MT	255 Leg. & Soc. Envir.
EHA	315 Bus. & Prof. Rpt. Wri. or		Elective.....4		of Bus. ....4
EHA	415 Writ. Bus. Comm. ....3			HF	225 Flower Arrang. ....3
AEC	202 Ag. Economics II.....5				Elective.....5

SENIOR YEAR

ENT 502 Econ. Ent. ....5	AY 502 Soil Fert. or	BY 506 Syst. Bot. ....5
MN 310 Prin. of Mgt. ....4	AY 506 Fert. & Soil Test. ....5	HF 522 Flor. Crop Prod. ....5
MT 331 Prin. of Market. ....5	HF 425 Flower Shop Mgt. ....5	Elective .....5
Elective .....5	MT 333 Merch. Mgt. ....5	
	Elective .....5	

TOTAL — 210 QUARTER HOURS

Integrated Pest Management (IPM)

The Integrated Pest Management curriculum in the Department of Entomology is designed to provide the student with a broad base of training in the pest sciences. This option will prepare the student for employment in many phases of animal and plant agriculture. It also can be used as the basis for advanced study in such fields as entomology, plant pathology, nematology, and weed science.

FRESHMAN YEAR

First Quarter

BI 101 Prin. Biology .....5
CH 103 Fund. Chem. I .....4
CH 103L Gen. Chem. Lab. ....1
MH 160 Pre-Cal. w/Trig. ....5
Electives .....2

Second Quarter

BI 102 Plant Biology .....5
CH 104 Fund. Chem. II .....4
CH 104L Gen. Chem. Lab. ....1
MH 161 An. Geom. & Cal. ....5
Electives .....2

Third Quarter

EH 101 English Comp .....3
BI 103 Animal Biology .....5
AEC 200 Ag. Econ. I .....5
HY 101 World History .....3
Elective .....1

SOPHOMORE YEAR

ENT 304 Gen. Entomol. ....5
EH 102 English Comp .....3
HY 102 World History .....3
PS 200 Found. Physics .....5
Elective .....1

ZY 300 Genetics .....5
CH 207 Organic Chem. ....4
CH 207L Org. Chem. Lab. ....1
EH 103 English Comp .....3
HY 103 World History .....3
Elective .....1

AY 304 Gen. Soils .....5
MB 300 Microbiology .....5
CH 208 Organic Chem. ....3
CH 208L Org. Chem. Lab. ....2
Electives .....2

JUNIOR YEAR

AY 312 Prin. Weed Sci. ....5
ZY 306 Prin. of Ecol. ....5
BY 306 Plant Physiology .....5
AEC 210 Microcom. Appl. ....3

AY 200 Crop. Production .....5
PLP 309 Plant Pathology .....5
EHA 415 Bus. Prof. Comm
or
SC 111 Public Spk .....5
Electives .....3

ENT 405 Appl. Ent. ....5
AEC 510 Agric. Bus. Mgt. ....3
Electives .....10

SENIOR YEAR

ENT 406 Alt. Methods Con. ....5
Electives .....13

ENT 503 Toxicology .....5
ENT 404 Insects Affecting
Man and Animals .....5
Electives .....8

AY 502 Soil Fertility .....5
Entomology Elec. ....5
Electives .....8

TOTAL — 210 QUARTER HOURS

Elective courses must include at least 20 hours from the approved list of group electives and 15 hours selected from the approved list of Humanities and Social Sciences. Entomology electives to be selected with consent of adviser.

Poultry Science (PH)

The program is designed to allow students to choose courses in science and business. In most cases students anticipating study beyond the B.S. degree should choose electives for the science option. The electives in the business area provide the student opportunity to prepare for sales, service, and related agribusiness professions.

FRESHMAN YEAR

First Quarter

CH 103 Fund. Chem I .....4
CH 103L Fund. Chem Lab .....1
MH 160 Pre Cal. w/Trig. ....5
PH 201 Poultry Science .....5
Basic ROTC or
Elective* .....1
Elective* .....1

Second Quarter

CH 104 Fund. Chem II .....4
CH 104L Fund. Chem Lab .....1
MH 151 Finite Math†† or
MH 161 An. Geom. & Cal. ....5
EH 101 English Comp. ....3
BI 101 Prin. of Biology .....5
Basic ROTC or
Elective .....1

Third Quarter

BI 103 Animal Biology .....5
EH 102 English Comp. ....3
HY Requirement** .....3
CH 203 Organic Chem. ....5
or
CH 207 Organic Chem. ....4
CH 207L Organic Chem. Lab. ....1
Basic ROTC or Elect. ....1
Elective .....1

SOPHOMORE YEAR											
HY		Requirement**	3	HY		Requirement**	3	ZY	300	Genetics	5
ADS	220	Intr. An. Nutr.	5	PS	200	Fund. of Physics	5	PG	211	Psychology	5
EH	103	English Comp.	3	AEC	200	Agr. Econ.	5	SC	111	Public Speaking	5
		Basic ROTC or		BST	216	Intr. Bio. Comptr. or				Prof. Electives***	3
		Elective*	1	AEC	210	Microcomptr. Appl.				Basic ROTC or	
		Elective*	1			in Ag.	3			Elective*	1
ZY	316	Phy. of Dom. An.	5			Basic ROTC or					
						Elective	1				
JUNIOR YEAR											
AY	304	Soils	5	SC	141	Group Prob. Solv.	5	PH	506	Fert. & Hatch	5
MB	300	Gen. Microbiology	5	PH	501	Comm. Meat Prod.	5	PH	410	Poultry Breeding	3
		Plant Sci. Elective†	5			Prof. Electives***	3			Prof. Electives***	9
		Prof. Electives***	3	PH	515	Avian Repro. &					
						Env. Physiol.	5				
SENIOR YEAR											
PH	505	Poultry Feeding	5	PH	502	Comm. Egg Prod	5	AEC	510	Agri. Bus. Mgt. or	
ENT	502	Economic Entom.	5			Prof. Electives***	10	AEC	501	Farm Mgt	5
PH	401	Jr.-Sr. Seminar	1					PH	508	Cont. Poul. Dis & Par	5
		Prof. Electives***	8					PH	511	Proc. & Mkt.	5

TOTAL — 210 QUARTER HOURS

*Students may choose electives from humanities and social sciences categories.

**World History 101, 102, 103 (9); or Technology and Civilization 204, 205, 206 (9); or World Literature 260, 261, 262 (9); or Art History 171, 172, 173 (9).

***A minimum of 41 credit hours must be taken from the list of electives that is available in the office of the adviser and the dean.

†Principles of Grain Prod AY 301 (5) or Crop Prod AY 200 (5) or Principles of Forage Prod AY 401 (5) or Orchard Mgt HF 201 (5) or Vegetable Crops HF 308 (5) or Farm Forestry FY 350 (5).

††Students in the terminal production curriculum may substitute college Algebra MH140 for MH160 and Biological statistics BST215 for MH151 or MH161.

Poultry Science Pre-Veterinary Medicine Option (PH-PV)

FRESHMAN YEAR					
First Quarter		Second Quarter		Third Quarter	
CH	103 Fund. of Chem I.....4	CH	104 Fund. of Chem II.....4	CH	105 Fund. of Chem III.....4
CH	103L Gen. Chem. Lab.....1	CH	104L Gen. Chem. Lab.....1	CH	105L Gen. Chem. Lab.....1
MH	160 Pre-Cal w/Trig**.....5	MH	151 Finite Math**.....3	BI	101 Prin. of Biology.....5
HY	*.....3		or.....3	HY	*.....3
PH	201 Poultry Science.....5	MH	161 An. Geom. & Cal.....5	EH	102 English Comp.....3
	ROTC or Elect.....1	HY	*.....3		ROTC or Elect.....1
		EH	101 English Comp.....3		
			ROTC or Elect.....1		
SOPHOMORE YEAR					
CH	207 Org. Chem.....4	CH	208 Org. Chem.....3	PS	206 Intr. Physics II.....3
CH	207L Org. Chem. Lab.....1	CH	208L Org. Chem. Lab.....2	PS	206L Physics Lab.....1
BI	103 Animal Biology.....5	PS	205 Intr. Physics I.....3	MB	300 Gen. Microbiol.....5
EH	103 English Comp.....3	PS	205L Physics Lab.....1	ADS	220 An. Biochem. & Nut.....5
	ROTC or Elect.....1	BST	216 Intr. Bio Comptr. or.....3		ROTC or Elect.....1
		AEC	210 Microcomp. App. in Ag.....3		Elective.....3
			ROTC or Elect.....1		
		SC	111 Pub. Speaking.....5		
JUNIOR YEAR					
ZY	300 Genetics.....5	PG	211 Psychology.....5	PO	209 American Govt.....5
ADS	200 Intr. An. & Dairy.....5	AEC	200 Ag. Economics I.....5	ADS	320 Feeds & Feeding.....4
	Science.....5	PH	501 Comm. Meat Prod.....5	PH	506 Fert. & Hatch.....5
PH	505 Poultry Feeding.....5	EH	141 Med. Vocab.....3	PH	511 Proc. & Mkt.....5
PS	207 Intr. Physics III.....3				
PS	207 Physics Lab.....1				

In the event the first-year Veterinary College alternative is not followed, the following must be completed successfully to receive the B.S. degree in Poultry Science.

ENT 502 Economic Entomol. ....5	AEC 510 Agri. Bus. Mgt. ....5
ZY 316 Phy. Dom. An. ....5	or
PH 401 Jr.-Sr. Seminar ....1	AEC 501 Farm Mgt. ....5
AY 304 Soils ....5	PH 508 Cont. Poul. Dis. &
PH 502 Com. Egg Prod. ....5	Par. ....5
SC 141 Group Prob. Solving ....5	PH 410 Poul. Breeding ....3
PH 515 Avian Repro. & Env.	Electives ....2
Physiol. ....5	

TOTAL — 210 QUARTER HOURS

*World History 101, 102, 103 (9) or Technology and Civilization 204, 205, 206 (9) or World Literature 260, 261, 262 (9) or Art History 171, 172, 173 (9).

**Students who do not desire to take a graduate degree may substitute College Algebra MH 140 for MH 160 and Biological Statistics BST 215 for MH 151 or MH 161.

Electives must be taken from a list available in the office of the dean in consultation with the student's adviser.

Rural Sociology (RSY)

The Rural Sociology curriculum emphasizes the application of scientific knowledge to human problems. Course sequence provides a fundamental preparation in the humanities, mathematics, and the sciences, as well as in the basics of production agriculture. The core of the curriculum is comprised of a major in rural sociology coupled with a minor in agricultural economics and broad exposure to other social and agricultural sciences.

Human services occupations represent an area of expanding employment opportunity. Graduates are qualified for work involving administration of state and federal programs designed to serve the elderly, handicapped, poor, youth, unemployed, and others. Employment opportunities exist in regional and urban planning units, agricultural agencies, agribusiness firms and other organizations desiring employees with human relations as well as agricultural and economic skills.

First Quarter			FRESHMAN YEAR			Third Quarter		
			Second Quarter					
MH 160 Pre-Cal. w/Trig. ....5			MH 161 An. Geom. Cal. ....5			CH 103 Fund. Chem. & Lab. ....5		
BI 101 Prin. of Biology ....5			BI 102 Plant Biology ....5			BI 103 Animal Biology ....5		
EH 101 English Comp. ....3			EH 102 English Comp. ....3			EH 103 English Comp. ....3		
HY Requirement* ....3			HY Requirement ....3			RSY 261 Intr. to Rural		
ROTC or elective ....1			ROTC or elective ....1			Sociology ....5		
						ROTC or elective ....1		
			SOPHOMORE YEAR					
CH 104 Fund. Chem. & Lab. ....5			PO 210 S&L Govern. ....5			SY 220 Statistics** ....5		
HY Requirement* ....3			ADS 200 Intr. An. & Dairy Sc. ....5			RSY 362 Community Org. ....5		
AEC 200 Ag. Econ. I. ....5			PG 212 Dev. Psychology ....3			AY 200 Crop Prod. ....5		
SY 204 Soc. Behavior ....5			AEC 202 Ag. Econ II. ....5			MN 207 Intr. Comp. Prog.** ....3		
ROTC or elective ....1			ROTC or elective ....1			ROTC or elective ....1		
			JUNIOR YEAR					
AEC 301 Ag. Marketing ....5			PH 201 Poultry Sci. or			EHA 315 Bus. & Prof. Report		
RSY 370 Meth. of Soc. Res. ....5			FY 350 Farm Forestry ....5			Writing ....3		
AY 307 Gen. Soils ....5			AEC 304 Ag. Finance ....5			RSY 561 Rur. Sociology ....5		
Elective ....3			PO 325 Intr. Pub. Adm. ....5			SW 376 Comm. Soc. Services ....5		
			SC 140 App. Speech Comm. ....3			Elective ....3		
			SENIOR YEAR					
SY 502 Soc. Theory ....5			AEC 505 Ag. Policy ....3			RSY 541 Ext. Prog. & Meth. ....5		
AEC 510 Ag. Bus. Mgt. ....5			RSY 562 Soc. of Comm. Dev. ....5			RSY 565 Soc. Nat. Res. & Env. ....5		
RSY 498 Dir. Field Exp. ....5			AEC 490 Senior Seminar ....1			RP 474 Intr. Planning ....3		
Electives ....3			Electives ....5			Electives ....3		

TOTAL — 210 QUARTER HOURS

*Select one of four sequences: World History HY 101-2-3 (9); or Technology and Civilization HY 204-5-6 (9); or Survey of Western Literature EH 260-1-2 (9); or Art History AT 171-2-3 (9).

**Or Equivalent Course.

Student is encouraged to select electives in areas of agriculture and social sciences.

School of Architecture

RAY K. PARKER, *Dean*

THE SCHOOL OF ARCHITECTURE consists of three departments, Architecture, Building Science, and Industrial Design, with undergraduate programs in Architecture, Interior Design, Landscape Architecture, Building Science and Industrial Design*. Graduate degrees are offered in Industrial Design and Community Planning. For details, see the Graduate School Bulletin.

Architecture: The profession of architecture offers the unique opportunity to improve the physical environment through the development and interpretation of functional, and visual relationships that form our world and its artifacts. The five-year Bachelor of Architecture degree employs a humanistic approach to education and emphasizes the development of the individual in such manner that the graduate is prepared to provide both a meaningful and significant contribution to society.

Building Science: The curriculum in Building Science develops knowledgeable practitioners and managers for a wide variety of roles in the construction industry. The Department of Building Science offers courses in structural and mechanical systems for buildings, construction procedures, cost estimation, and construction management. The four-year curriculum leads to the degree of Bachelor of Science in Building Construction.

Industrial Design: This department is concerned primarily with the practical and aesthetic relationship of products and systems to those who use them. The industrial designer is responsible for the product's shape, color, proportion, and texture, and for the optimum interaction between man and technology in a system. The professional is deeply concerned with such factors of use as efficiency, convenience, safety, comfort, maintenance, and cost. The four-year curriculum leads to the degree of Bachelor of Industrial Design. Graduates will qualify for positions in industrial design consultant offices and in various industries.

Interior Design: The curriculum in Interior Design prepares the graduate as a specialist in the design of interior space, and as such, to assume a responsible role among those who shape the physical environment. The four-year curriculum leading to the Bachelor of Interior Design degree encompasses the development of interior space in the context of social, cultural, historical, and technical implications which include the selections of furniture, fixtures, equipment, materials, and finishes.

Landscape Architecture: The Landscape Architecture Program is design-based and benefits from its unique relationship with the Architecture, Community Planning, and Interior Design programs within the Department of Architecture. Primary emphasis on the physical design process in the context of the natural and man-made landscape provides the student with a comprehensive appreciation of the role of the design professional within society. The five-year curriculum leads to the professional degree of Bachelor of Landscape Architecture.

*The School of Architecture maintains the right to limit enrollment in all programs.

Department of Architecture

Entering Freshmen eligibility for admission to Architecture, Interior Design, and Landscape Architecture, is determined by the Admissions Office on the basis of the candidate's test scores and previous academic record. These criteria are in addition to those stated in the General Admission Requirements of the University.

Transfer Students from non-architectural programs are required to begin the design sequence with AR 101. Transfer students from accredited schools of Architecture will be required to present a portfolio of their work to the Design Coordinating Committee for evaluation. Assuming acceptance, the Committee will determine the level of placement in the design sequence.

Academic Standards and Policies - All design studio courses must be taken in sequence and in observance of the prerequisite courses as stated. Any student receiving a grade below C in AR 101, 102, 103, or AR 201, 202, 203, will be reviewed by the Design Review Committee at the end of the year for approval to continue in the design sequence. Similarly,

a student with a majority of grades at the **C** level may be summoned by the Committee for review. All students completing the second year design sequence will be reviewed for continuance into the third year design sequence.

Any student in the design sequence above the second-year level who receives a grade below **C** will be required to repeat the course. The student receiving a grade below **C** for a subsequent attempt in a design course will be required to come before the Design Review Committee for approval before advancing in the design sequence.

All required first and second year course work must be successfully completed prior to entry into the third year of design studio. Similarly, all required third and fourth year course work must be completed prior to entry into the fifth year of design studio and research. Enrollment in 300- and 400-level BSC courses will be limited to those with an overall grade point average of 2.3 or above and junior standing in design.

The equivalent of two summers of professional experience in architectural, engineering, construction, or related fields is recommended prior to entry into the fifth-year design level. The Department of Architecture participates in the Cooperative Education program of the University. A one-quarter foreign study program is offered to qualified students.

Completed student work may be retained by the School for indefinite periods for exhibition or for records and accreditation purposes. Return of such work is at the discretion of the department head.

Department of Building Science

Entering Freshmen who meet Auburn University's admissions standards will be accepted into the Pre-Building Science program for Summer or Fall quarters.

Transfer Students from other institutions must have a minimum grade point average of 2.8 and will be accepted on a space available basis as determined by the department head.

Academic Standards and Policies - To be classified as 03 BSC, the student must have completed all course work shown in the first two years of the model curriculum, have a 2.3 cumulative grade point average on all courses attempted at Auburn University, and have a minimum of 96 quarter hours. Students in the Department of Architecture will be admitted in 300- and 400-level BSC courses upon completion of second-year design.

Department of Industrial Design

Entering Freshmen who meet the general admission requirements of Auburn University will be admitted to the Pre-Industrial Design Program.

Transfer Students from other institutions must meet the University admission requirements. Students transferring from other design disciplines will be required to present examples of their work to determine studio placement. Internal transfer students should contact the Department of Industrial Design to determine eligibility.

Summer Design Program - Transfer students who have completed courses in the model curriculum for the freshman year may qualify for the Summer Design Program. This program allows students to complete the first year Industrial Design Studio requirements. After completing this program students may enter the sophomore year of study. Contact the Department of Industrial Design for more information.

Academic Standards and Policies - Design courses must be taken in sequence and may not be taken simultaneously with prerequisites. All courses in the freshman year must be completed before entering the sophomore year of study. A grade of **C** or higher must be made in studio courses. Grades below **C** in studio courses 110 through 412 must be repeated. Admission to the Industrial Design curriculum in the sophomore year requires a 2.5 cumulative grade-point average.

Department of Architecture

Architecture

Architecture is the blending of aesthetics, function, space, and materials and is a profession committed to the betterment of the world in which we live. Today's architect must accept a concern for the improvement of the physical environment and assume a leadership role in effecting that end. Consequently, architects must bring to their work a concern for,

Auburn University, School of Architecture is a member of the Association of Collegiate Schools of Architecture and the program is accredited by the National Architectural Accrediting Board. The program prepares the graduate for exciting challenges of the profession and qualifies the person to sit for the National Council of Architectural Registration Boards examination upon completion of the Intern Development Program.

Summer employment in the office of an architect is strongly encouraged along with active participation in the Intern Development Program (IDP) after completion of the third year in the curriculum. IDP is a prerequisite to licensing in the State of Alabama and is mandatory in most states.

Curriculum in Architecture (AR)

FIRST YEAR		
First Quarter		
AR	101	Design Fund.* .....5
EH	101	English Comp. ....3
MH	160	Pre. Cal. w/Trig.....5
HY		Elective**.....3
Second Quarter		
AR	102	Design Fund.* .....5
EH	102	English Comp. ....3
MH	161	An. Geom. & Cal. ....5
HY		Elective**.....3
Third Quarter		
AR	103	Design Fund.* .....5
EH	103	English Comp. ....3
AR	121	Comp. in Arch. ....3
HY		Elective**.....3
		Elective.....3
SECOND YEAR		
AR	201	Arch. Design.....5
PS	205	Intr. Physics I .....4
AR	261	Hist. & Theo. Arch. ....3
BSC	202	Matls. of Constr. ....5
AR	202	Arch. Design.....5
PS	206	Intr. Physics II.....4
AR	262	Hist. & Theo. Arch. ....3
BSC	204	Constr. Systems.....3
		Elective.....3
AR	203	Arch. Design.....5
PS	207	Intr. Physics III.....4
AR	263	Hist. & Theo. Arch. ....3
BSC	211	Mech. of Structures ....5
THIRD YEAR		
AR	301	Arch. Design.....5
BSC	311	Strgh. of Matl. ....5
AR	350	20th Century Arch. ....3
BSC	351	Bldg. Energy .....3
		Elective.....2
AR	302	Arch. Design.....5
BSC	314	Reinf. Concrete .....5
BSC	352	Building Equip. I .....3
		Elective.....6
AR	303	Arch. Design.....5
BSC	315	Applied Struc. ....5
BSC	353	Building Equip. II.....3
		Elective.....5
FOURTH YEAR		
AR	401	Arch. Design.....5
EH		English Lit.***.....3
AR	475	Urban Design.....3
		Elective.....7
AR	402	Arch. Design.....5
EH	401	Lit. Analysis.....3
AR	474	Intr. Urb. Plan.....3
AR		Seminar.....3
		Elective.....3
AR	403	Arch. Design.....5
EH	402	Lit. Structure.....3
AR		Seminar.....3
		Elective.....3
		Elective.....3
FIFTH YEAR		
AR	465	Arch. Design.....8
AR	471	Prof. Practice .....3
AR		Seminar.....3
		Elec. or AR Seminar ....3
AR	466	Arch. Design.....8
AR	472	Prof. Practice .....3
AR	499	Design Research.....2
		Elec. or AR Seminar ....3
AR	467	Arch. Design.....8
AR		Seminar.....3
		Elective.....5

BACHELOR OF ARCHITECTURE
TOTAL — 257 QUARTER HOURS

¹⁷³World History, HY 101, 102, 103; or Technology and Civilization, HY 121, 122, 123; or Art History, AT 171, 172.

***Any English course in Literature 200 or above.

One seminar will be chosen from each of four of the following categories. The Ascent of Man course may be substituted for one seminar.

- AR 451 Seminars in Methods and Process
AR 452 Seminars in Contemporary Issues
AR 453 Seminars in Interdisciplinary Studies
AR 456 Seminars in Historical Perspectives
AR 457 Seminars in Aspects of Design
AR 458 Seminars in Disciplines of Environmental Design

Interior Design

The specific aim of the Interior Design Program is to develop graduates who are capable of formulating creative and appropriate design solutions for the complex needs of today's society with regard to the spatial organization for human activity. The curriculum is organized to develop individuals who are prepared to make thoughtful, creative design decisions which are based on theory and function. The Bachelor of Interior Design degree prepares the graduate to assume a responsible role in the area of interior space design as well as the understanding of collaborative efforts of problem solving to meet the complex needs of society.

The Interior Design Program is accredited by the Foundation for Interior Design Education and Research (FIDER) and has an active student chapter of the American Society of Interior Designers (ASID).

Summer employment with a professional interior designer to gain experience is recommended between the third and fourth year of design.

Curriculum in Interior Design (ID)

FIRST YEAR											
First Quarter				Second Quarter				Third Quarter			
AR	101	Design Fund.*	5	AR	102	Design Fund.*	5	AR	103	Design Fund.*	5
EH	101	English Comp.	3	EH	102	English Comp.	3	EH	103	English Comp.	3
AT	171	Hist. World Art**	3	AT	172	Hist. World Art**	3	AT	173	Hist. World Art**	3
MH	140	College Algebra	5	MH	161	An. Geom. & Cal.***	5	PG	211	Psychology	5
								Elective			3
SECOND YEAR											
AR	201	Arch. Design	5	AR	202	Arch. Design	5	AR	203	Arch. Design	5
ID	215	Elements of I.D.	5	ID	216	Elements of I.D.	5	ID	217	Elements of I.D.	5
AR	261	Hist. & Theo. Arch.	3	AR	262	Hist. & Theo. Arch.	3	AR	263	Hist. & Theo. Arch.	3
Nat. Sci. Elective			5	Nat. Sci. Elective			5	SY	201	Sociology	3
THIRD YEAR											
ID	305	Interior Design	5	ID	306	Interior Design	5	ID	307	Interior Design	5
ID	365	Period Int.	3	ID	366	Period Interiors	3	ID	367	Contemp. Int.	3
AR	469	Lighting	3	MN	310	Prin. Manag.****	4	ID	495	Special Probs.	3
AR	350	20th Century Arch.	3	BSC	204	Constr. Systems	3	EHA	304	Tech. Writing*****	3
Elective			3					Elective			3
FOURTH YEAR											
ID	405	Interior Design	5	ID	406	Interior Design	5	ID	407	Int. Design (Thesis)	7
ID	441	Prof. Prac.	3	ID	408	Int. Design Res.	2	Elective		5	
Elective			5	Creative Crafts,				Elective		4	
Elective			5	Textile Design,							
				Weaving or							
				Photography			3				
				ID	442	Prof. Prac.	3				
				Elective			5				

BACHELOR OF INTERIOR DESIGN

TOTAL — 206 QUARTER HOURS

*These courses are taught during the calendar year as well as concurrently during the summer.

**AT 371, 372, or 373, Art History may be substituted for AT 171, 172 or 173.

***MH 161 or ACF 215 Fund. of Gen. and Cost Accounting (5) or AR 121.

****EC 200 Economics I or MT 241 Business Law.

*****EHA 304 or SC 202 Appl. Speech Comm. (3) or SC 111 Public Speaking (5).

Landscape Architecture

Landscape Architecture is the planning and design of land and water for optimum human habitation and fulfillment. In its development, the profession of Landscape Architecture has evolved to include a wide range and scale of activities from the design of intimate gardens to the development of regional environmental analysis and natural resource planning. Sound preparation for a career in Landscape Architecture requires a thorough professional education, drawing from nature, man, art, and technology for its strength. The curriculum addresses itself to the landscape architect's role in understanding and balancing the relationship between human enterprise and the natural environment.

The course of study in Landscape Architecture acknowledges the regional culture of its locale and student body while seeking to present an attitude toward design which is informed and world-based. The primary mission of the program is to: build upon the cultural value base of the region; expand the student's scope of perception, experience, and technique; and develop an intellectual attitude of inquiry, tolerance, and professionalism. Students are encouraged to develop the capability to bring order and balance to the environment in a way that reflects the highest values and aspirations of the human condition, unrestrained by popular convention. This capability is accomplished through knowledge, understanding, clarity of thought, and skill.

The Bachelor of Landscape Architecture (the professional accredited degree) is awarded upon the successful completion of the fifth year of study. Qualified students may also elect to pursue concurrently the Master of Community Planning degree under a special dual degree program during the fifth year of study. The total curriculum prepares the student for professional practice, as well as for the registration examination in Landscape Architecture.

Curriculum in Landscape Architecture (LA)

FIRST YEAR											
First Quarter			Second Quarter		Third Quarter						
AR	101	Design Fund.*	5	AR	102	Design Fund.*	5	AR	103	Design Fund.*	5
MH	160	Pre Cal. w/Trig.	5	BSC	202	Mat. of Const.	5	BSC	324	Const. Survey	3
EH	101	English Comp.	3	EH	102	English Comp.	3	EH	103	English Comp.	3
BI	105	Pers. in Biology	5	BI	107	Env. Biology	5	GY	214	Phys. Geog.**	5
SECOND YEAR											
AR	201	Arch. Design	5	AR	202	Arch. Design	5	AR	203	Arch. Design	5
LA	261	Intr. Land. Arch.	3	LA	262	Dev. Land. Arch. I	3	LA	263	Dev. Land. Arch. II	3
HY	101	World History***	3	HY	102	World History***	3	HF	321	Decid. Sh. & Vines	5
HF	222	Trees	5	HF	223	Everg. Sh. & Vines	5	HY	103	World History***	3
THIRD YEAR											
LA	301	Basic L.A. Design	5	LA	302	Basic L.A. Design	5	LA	303	Basic L.A. Design	5
BSC	204	Constr. Systems	3	LA	342	Lands. Const. II	5	LA	343	Lands. Const. III	5
SY	201	Intr. Sociology****	5	EC	206	Socio-Economics	3	PG	211	Psychology*****	5
LA	341	Lands. Const. I	5	AR	121	Comp. in Arch.	3	EHA	304	Tech. Writ.*****	3
						Elective	3				
FOURTH YEAR											
LA	401	Int. Lands. Design	5	LA	402	Int. Lands. Design	5	LA	403	Int. Lands. Design	5
SC	111	Public Speaking	5	LA	431	Adv. Plant. Comp.	5	LA	455	Land Arch. Seminar	5
AR	475	Urban Design	3	AR	474	Intr. Urb. Plng	3			Elective	6
ZY	306	Prin. of Ecology	5			Elective	5				
FIFTH YEAR											
LA	465	Adv. Lands. Design	8	LA	466	Adv. Lands. Design	8	LA	467	Adv. Lands. Design	8
LA	471	Prof. Practice I	5	LA	472	Prof. Practice II	5			Elective	3
LA	499	Design Research	2	HF	521	Care/Maint. Plants	5			Elective	3
		Elective	3								

BACHELOR OF LANDSCAPE ARCHITECTURE

TOTAL — 257 QUARTER HOURS

*These courses are taught during the calendar year as well as concurrently during the summer.

**GY 214 or GL 102 or 110 or AY 310.

***HY 101, 102, 103, Technology and Civilization (HY 121, 122, 123), or Art (AT 171, 172, 173).

****SY 201 or Rural Sociology (RSY 261) or Geography (GY 520).

*****PG 211 or 212 or 213.

*****EHA 304 or 315.

Department Of Building Science

The Building Science graduate's activity encompasses many functions relating to construction of buildings - estimating, scheduling, supervising, and managing projects. Students in Building Science learn the basic principles of science, architecture, engineering, business, and construction.

The four-year curriculum leads to the degree of Bachelor of Science in Building Construction. Graduates qualify for positions in all phases of the construction industry.

The Cooperative Education Program is offered.

Non-majors will be accepted in BSC classes on a space available basis.

Curriculum in Building Science (BSC)

FIRST YEAR		
First Quarter	Second Quarter	Third Quarter
MH 160 Pre-Cal. w/Trig. ....5	MH 161 An. Geom. & Cal. ....5	MH 162 An. Geom. & Cal.** ....5
BSC 161 Hist. of Bldg. I. ....3	BSC 162 Hist. of Bldg. II. ....3	SC 140 App. Speech. ....3
EH 101 English Comp. ....3	EH 102 English Comp. ....3	EH 103 English Comp. ....3
HY 121 Tech. & Civil.* ....3	HY 122 Tech. & Civil.* ....3	HY 123 Tech. & Civil.* ....3
Elective ....3	Elective ....3	AR 100 Careers in Design/Construction ....2
SECOND YEAR		
BSC 202 Mats. of Const. ....5	BSC 203 Wkg. Drwg. & Spec. ....4	BSC 211 Mech. of Struct. ....5
EC 200 Gen. Economics ....5	ACF 211 Intr. Acct. ....4	AC 212 Intr. Acct. ....4
PS 205 Physics ....4	PS 206 Physics ....4	PS 207 Physics ....4
BSC 200 Draw. & Proj. ....3	Hum.-Soc. Elec. ....5	BSC 204 Constr. Systems ....3
THIRD YEAR		
BSC 311 Strength of Mtl. ....5	BSC 314 Reinforced Concrete ....5	BSC 315 App. Struct. ....5
BSC 324 Constr. Surveying ....3	MN 443 Labor Relations*** ....5	BSC 323 Fndatns. & Soils ....3
BSC 340 Cn. Saf. & Hv. Eq. ....3	BSC 352 Bldg. Equip. I. ....3	BSC 325 Temp. Structures ....3
BSC 371 Comp. in Const. ....3	MT 255 Leg. Envir. of Bus.*** ....4	BSC 353 Bldg. Equip. II. ....3
Business Elective ....4		Hum.-Soc. Elective ....5
FOURTH YEAR		
BSC 421 Constr. Estim. I. ....5	BSC 431 Constr. Estim. II. ....5	BSC 490 Terminal Project ....8
BSC 405 Contracting Bus. I. ....3	BSC 434 Constr. Schldg. ....5	Tech. Electives ....7
EHA 415 Writ. Bus. Comm. ....3	BSC 406 Contracting Bus. II. ....3	
Hum.-Soc. Elective ....5	HHP 494 First Aid ....3	
Tech. Elective ....3	Const. Elective ....3	

TOTAL — 207 QUARTER HOURS

*HY 101, 102, 103 may be substituted for HY 121, 122, 123.

**Five Qtr. hrs. Chemistry or MH 169 may be substituted for MH 162.

***MN 310 and 1 hr. technical elective may be substituted for MN 443.

****MT 241 may be substituted for MT 255.

Hum.-Soc. and Technical Electives must be selected from lists approved by the Department. Six hours of Basic ROTC may be substituted for six hours of general electives. Six hours of Advanced ROTC may be substituted for SC 140 and three hours of technical electives.

Department of Industrial Design

The Industrial Designer's activity encompasses areas such as product design, transportation design, package design, exhibition design, and systems design.

Students of Industrial Design learn the basic principles of design, engineering, human factors designing, marketing, and sociology. They acquire such technical skills as drafting, model-making, photography and sketching techniques. Students are introduced to design methods, product planning, visual statistics, materials, manufacturing methods, consumer psychology, and environmental studies.

The four-year curriculum leads to the professional degree of Bachelor of Industrial Design. Graduates will qualify for positions in industrial design consultant offices and in various industries.

The Cooperative Education Program is offered.

Curriculum in Industrial Design (IND)

FIRST YEAR		
First Quarter	Second Quarter	Third Quarter
IND 110 Drw. Syst. ....5	IND 111 Persp. Drw. ....5	IND 112 Drw. Des. Prod. ....5
MH 160 Pre. Cal w/Trig. ....5	AR 100 Careers in Design/Construction ....2	AR 121 Comptrs. in Arch. ....3
EH 101 English Comp. ....3	MH 161 An. Geom. & Cal. ....5	EH 103 English Comp. ....3
HY 121 Tech. & Civilization ....3	EH 102 English Comp. ....3	Nat. Sci. Elec. ....5
	HY 122 Tech. & Civilization3	

SECOND YEAR

IND 210 Prin. IND I.....5	IND 211 Prin. IND II.....5	IND 212 Prin. IND III.....5
IND 221 Materials & Tech.....5	SC 111 Public Spkng. ....5	IND 223 Ind. Des. Methods.....5
PG 212 Dev. Psychology.....5	EC 202 Economics II.....5	PS 205 Intr. Physics I.....4
Elective.....3	Elective.....3	Elective.....4

THIRD YEAR

IND 310 IND/Concept Dev. ....6	IND 311 IND/Prod. Des. ....6	IND 312 IND/Packaging.....6
IND 385 Sem. in IND .....5	IND 308 Design Workshop .....5	IND 307 Anthropometry .....5
EHA 304 Tech. Writing .....3	AT Art Hist. Elective .....3	MT 331 Prin. of Marketing.....5
Elective.....3	Elective.....5	Elective.....3

FOURTH YEAR

IND 410 IND/Systems.....6	IND 411 IND/Adv. Product.....6	IND 412 IND/Thesis .....6
IND 415 History of IND .....5	IND 420 Prof. Practice .....5	IND 485 Sem. in IND .....5
Elective.....5	PG 465 Psycho. & Design.....5	Elective.....5

BACHELOR OF INDUSTRIAL DESIGN**TOTAL — 207 QUARTER HOURS**

Students who hold a bachelor's degree are eligible to apply to the Dean of the Graduate School for admission to the graduate program leading to the Master of Industrial Design degree. For details, see the *Graduate School Bulletin*.



College of Business

DANNY N. BELLENGER, *Dean*

THE COLLEGE OF BUSINESS prepares students to become effective and socially responsible managers of business and industrial organizations and government agencies and responsible citizens and leaders of society.

To achieve this goal, the College offers undergraduate programs leading to the Bachelor of Science in Business Administration. In addition, it offers graduate work for the degrees of Master of Business Administration (MBA), Master of Science (MS) in both Economics and Business, Master of Accountancy (MAc), the Master of Arts in College Teaching (MACT), and the Doctor of Philosophy in Economics, and Management. For the degree of Master of Science in Business (MS), students are currently being enrolled in the Management Department concentration options of Human Resources Management, Management Information Systems, and Production/Operations Management. The College of Business is accredited at the undergraduate and graduate levels by the American Assembly of Collegiate Schools of Business. More detailed information on the graduate programs may be found in the *Graduate School Bulletin*.

Curriculum

The undergraduate curriculum includes a two-year Pre-Business Program required of all students and a two-year Professional Option Program. These programs provide a balanced course of study for all students, with approximately one-half of the hours in business and economics courses and one-half in courses offered outside the College. The courses required have been selected so that all students will have access to the "common body of knowledge" as designated by the American Assembly of Collegiate Schools of Business.

The Pre-Business Program, a plan followed by all business students in their freshman and sophomore years, provides a sound foundation of work in the arts and sciences, including courses in mathematics, humanities, social sciences, and natural sciences. This lower division program also includes some of the introductory business courses.

The Professional Option Programs are offered through the School of Accountancy and the Departments of Finance; Economics; Management; and of Marketing and Transportation and Physical Distribution. The Professional Option plans allow each student to concentrate in an area of interest during the junior and senior years. The ten options available include: Accountancy (AC), Finance (FI), International Business (IB), Economics (EC), Management (MN), General Business-Theatre (GBT), Operations Management (OM), Human Resources Management (HRMN), Marketing (MK) and Transportation and Physical Distribution (TN). Through these programs, the College seeks to develop in its students the analytical, decision-making and communication skills required of managers who lead modern organizations.

Business Minor — A Business Minor has been established within the College of Business for non-business majors. The courses required correspond with the common body of knowledge as specified by the American Assembly of Collegiate Schools of Business. Completion of these courses provides a student with the basic understanding of the foundations of business administration and facilitates progress toward graduate work in business. The courses required for a business minor are: EC 301 (EC 200 and 202 may be substituted), MN 310, AC 215 (AC 211 and 212 may be substituted), MT 331, and FI 361.

Admission to the College

Students entering the Pre-Business Program directly from high school or another college or university, in addition to meeting Auburn University's admission requirements, should have competence in the mathematics taught in high school geometry and second year algebra. Students also may transfer into the program from another school on campus if they have attained an overall grade point average of at least 2.0 on all courses attempted at Auburn University.

Admission to Business Courses

Effective Fall Quarter 1990, a 2.0 GPA will be required for enrollment in any Business course at the 300-level and above. This rule will apply to both Business and non-Business students.

Graduation Requirements

To be graduated, business students must meet the hours and subject matter requirements of their curricula and must have an overall average of at least 2.0 on all courses attempted at Auburn University.

Student Advising System

The Office of Student Affairs of the College of Business is responsible for orienting all new students, freshmen and transferees to the College. All students report each quarter to Student Affairs, Thach 215, to plan their academic schedules and to obtain information.

Faculty members are available to all students for academic counseling and career guidance. Students are encouraged to seek advice on professional and academic questions from department heads and faculty through personal arrangements or appointments made by Student Affairs.

Student Affairs is also available to assist students from another College or School on campus to pursue a second baccalaureate degree in the College of Business.

Cooperative Education Program

Business students are eligible to participate in the University's Cooperative Education Program. This program allows students to combine academic training with actual business experience.

Pre-Business Program

The requirements of the Pre-Business Program are given in the model below. Students who enter from high school register in this program until they complete all Pre-Business requirements. Students who enter by transfer and who have not yet completed all Pre-Business requirements, must register in the Pre-Business Program.

Before being admitted into a Professional Option Program, business students must complete all courses in the Pre-Business Program with a satisfactory academic record.

Pre-Business Program

FRESHMAN YEAR		
First Quarter		
MH 140	College Algebra*	5
	Science**	5
EH 101	English Comp.	3
	HY/AT/EH***	3
	ROTC or Elective	1
Second Quarter		
MH 161	An. Geom. & Cal.	5
	Science**	5
EH 102	English Comp.	3
	HY/AT/EH***	3
	ROTC or Elective	1
Third Quarter		
MH 169	Bus. Math w/Cal. App.	5
PG 211	Psychology	5
EH 103	English Comp.	3
	HY/AT/EH***	3
	ROTC or Elective	1
SOPHOMORE YEAR		
EC 200	Economics I.	5
AC 211	Intr. Acct. I†	4
	Elective‡	3
	Elective†	3
	ROTC or Elective	1
EC 202	Economics II.	5
MN 274	Statistics I.	5
AC 212	Intr. Acct. II.	4
	Elective††	3
	ROTC or Elective	1
SC 111	Public Speaking	5
MT 255	Legal & Soc. Environ.	4
EHA 315	B & P Report Writing	3
	Elective†††	4
	ROTC or Elective	1

*Students may take MH 160 instead. Credit is not allowed for both MH 140 and MH 160.

**Ten hours of Science are required to be selected from the following courses: BI 105 and 106 or 107; CH 101-102-104 or CH 103-104; GL 101-102-103 or 110-103; PHS 100-101; PS 205-206-207. Credit will not be given for both PHS 100 and PS 200, 205, or 220.

***Students must take 9 hours from one of the following sequences: World History, HY 101-102-103, Technology and Civilization, HY 121-122-123, History of Art, AT 171-172-173, or Western World Literature (Prerequisite EH 103. Courses to be taken in sequence), EH 260-261-262.

†Students planning to enter the Accountancy Option should take AC 211 and AC 212 during the second and third quarters of their sophomore year.

††Students planning to major in Marketing (MK) or Transportation (TN) are required to take MN 207: Introduction to Computer Programming (3 hours). Students planning to major in Management (MN) are required to take 3 hours of a designated elective.

††Electives may be from any area, subject to departmental requirements. During the four years of study a minimum of 40 percent of all hours required for graduation must be taken in Business and Economics and a minimum of 40 percent in non-business subjects.

Accountancy and Finance students are encouraged to take PA 111 (Basic Reasoning) as an elective. Students planning to major in Marketing or Transportation are required to take PA 111 and PA 211 (Introduction to Deductive Logic).

††Students who have not taken typewriting in high school are strongly encouraged to take VED 200. Students in the Management Option will use two hours of this elective in the Junior and Senior years and one hour for SY 201 in the third quarter of the Sophomore Year.

†††Students in the Management and Human Resources Management options take SY 201.

School of Accountancy

Accountancy (AC)

A sound knowledge of the fundamentals of accountancy is essential to success in any economic endeavor. Accountancy is the language of business, and accounting procedures and records are the basic ingredients for sound management decision-making in both business and non-business organizations, including public and philanthropic bodies. Financial reports are required by the Securities and Exchange Commission with the sale of stocks and bonds which form the capital structure of our economic society. They are the basis for determining income taxes due federal and state governments.

The Professional Option Program in Accountancy develops the student's ability to work effectively, to exercise mental discipline and to communicate orally and in writing. The student gains an appreciation of the accountant's high standard of integrity and objectivity in reporting and an awareness of the responsibility for self-education upon entering a career in accountancy.

The Professional Option Program in Accountancy is intended to attract to accountancy careers those students who seem to possess the potential for making a contribution to the advancement of accountancy and who have the aptitude which indicates a reasonable chance for a successful career.

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

First Quarter			JUNIOR YEAR Second Quarter			Third Quarter		
AC	311 Inter. Acct. I	5	AC	312 Inter. Acct. II	5	AC	313 Inter. Acct. III	5
FI	361 Prin. of Finance	5	AC	314 Income Tax	5	AC	319 Bus. Law for Acct.	5
MN	310 Prin. of Mgt.	5	MN	346 Org. Behavior	4	MT	331 Prin. of Mkt.	5
	Elective	3	MN	382 Mgt. Info. Sys.	5			
			SENIOR YEAR					
AC	410 Cost Acctng.	5	MN	480 Bus. Policies	5	AC	518 Adv. Acct.	5
AC	416 Auditing I	5	AC	514 Adv. Tax.	5	AC	511 Acct. Theory	5
EHA	415 Written Bus. Comm.	3	AC	420 Acct. Syst.	5		Elective	5-3
	Elective	4					Humanities Elective*	3-5

TOTAL — 203 QUARTER HOURS

*To be chosen from Anthropology, Economics, Foreign Language, History, Literature, Philosophy, Political Science, Psychology, or Sociology courses.

Department of Finance

Finance (FI)

The influence and the responsibilities of financial executives have been expanding dramatically in recent years. Financial officers are involved in the most profound decisions affecting the strategy of business operations. They decide to expand, merge, contract, and change. They are concerned not only with the pricing of products, but with the initial decision to produce them. All aspects of business affairs ultimately reduce to dollar terms, and the financial officers' intimate knowledge of the intricacies of financial operations place them in a vital role in corporate management.

The Professional Option Program in Finance offers students an opportunity to specialize in sub areas of finance. Courses in real estate are available.

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

First Quarter				JUNIOR YEAR				Second Quarter				Third Quarter			
FI	361	Prin. of Finance	5	AC	311	Inter. Acct. I	5	AC	312	Inter. Acct. II	5	FI	464	Investments	5
AC	213	Mgt. Cost & Bdgt.	4	FI	367	Money Mkts. &	5	FI	464	Investments	5	MN	346	Org. Behavior	4
MN	310	Prin. of Mgt.	5			Fin. Inst.	5								
MT	331	Prin. of Mkt.	5	MN	382	Mgt. Info. Systems	5								
						Elective	3								
				SENIOR YEAR											
FI	363	Adv. Bus. Finance	5			Fin. Elective	5	MN	480	Bus. Policies	5				
EHA	415	Written Bus. Comm.	3			Humanities				Dept. Elective	5				
		Fin. Elective	5			Elective*	3-5			Elective	5				
		Elective	5			Elective	5-3								
						Elective	5								

TOTAL — 204 QUARTER HOURS

Electives should be chosen in consultation with the adviser. See catalog course descriptions.

*To be chosen from Anthropology, Economics, Foreign Language, History, Literature, Philosophy, Political Science, Psychology, or Sociology courses.

International Business (IB)

The demand for managers trained in both foreign language and business principles is growing at an accelerated pace. The International Business Option provides the student with the opportunity to develop analytical and decision making skills necessary for effective participation in the global challenge facing American business today. The curriculum is designed to emphasize the additional risks encountered by international business firms and to enable the student to acquire proficiency in a foreign language including specialized business terminology. (See also Foreign Languages — International Trade Major in the College of Liberal Arts.)

FRESHMAN YEAR								
First Quarter		Second Quarter		Third Quarter				
EH	101 English Comp.	3	EH	102 English Comp.	3	EH	103 English Comp.	3
HY/EH/AT		3	HY/EH/AT		3	HY/EH/AT		3
MH	140 College Algebra	5	MH	161 Anal. Geo. & Cal.	5	MH	169 Bus. Math. w/Cal. App.	5
FL	Foreign Language*	5	FL		5	FL		5
SOPHOMORE YEAR								
EC	200 Econ. I	5	AC	211 Intr. Acct. I	4	AC	212 Intr. Acct. II	4
FL		5	EC	202 Econ. II	5	MT	255 Leg & Soc. Env.	4
PG	211 Psychology	5	MN	274 Statistics I	5	FL		5
			FL		5	SY	201 Sociology	5
JUNIOR YEAR								
MT	331 Prin. of Mktg.	5	MN	346 Org. Behavior	4	FI	361 Prin. of Fin.	5
MN	310 Prin. of Mgmt.	5		Science	5	MT	341 Buyer Behavior	5
FL	321/331/351 Conv. Lg.	3	FL	322/332/352 Comp.	3	FL	Civilization**	3
	Science	5		Elective	4	EC	571 Int'l Econ.	5
SENIOR YEAR								
MN	382 Mgt. Info. Sys.	5		Bus. Elective**	5	MN	480 Bus. Policies	5
MN	410 Int'l Mgmt.	5	FL	329/339/359 Bsns Lg.	3		Approv. Gy Course	5
	Elective	3-4		Approv. HY Course	5	MT	440 Int'l Mktg.	5
	Bus. Elective**	5	FI	451 Multinat'l Fin. Mgt.	5	FL	420/430/450 FL Int. Td.	4-3

TOTAL — 207 QUARTER HOURS

Approved History Courses HY 300, 301, 306, 337, 354, 355, 356, 516, 533, 550, 552, 554, 555, 557

Approved Geography Courses GY 304, 306, 307, 308, 309, 350, 401, depending on area of language specialization and interest.

*Language sequence to be taken exclusively in French, Spanish or German.

**A minimum of 5 hours to be chosen from College of Business courses at the 300 or above level.

***One required civilization course depending on area of language specialization: French FL 323; German FL 353; Spanish FL 333, 334, 335, 336 or 337.

Department of Economics

Business Economics (EC)

Economic understanding is the foundation of effective managerial decision-making. The Business Economics Professional Option provides students with the critical awareness and analytical capacity needed to succeed in managerial and administrative positions, whether in the private or public sector. The Business Economics curriculum provides maximum flexibility and broad-based preparation for future employment opportunities. Graduates are prepared for entry-level positions in many areas of business activity. In addition, the Economics Option provides excellent preparation for graduate or professional studies. (See also Economics Major in the College of Liberal Arts.)

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

First Quarter			JUNIOR YEAR Second Quarter			Third Quarter		
FI	361	Prin. of Finance5	EC	556	Inter. Macro- economics5	MT	331	Prin. of Mkt.5
EC	551	Inter. Micro- economics5	MN	346	Org. Behavior4			Humanities Elective*5
MN	310	Prin. of Mgt.5			Humanities Elective*5-3			Dept. Elective5
		Humanities Elective*3-5			Elective3			
			SENIOR YEAR					
EHA	415	Written Bus. Comm.3	EC	554	Hist. Ec. Thought5	MN	480	Bus. Policies5
		Dept. Elective5	MN	382	Mgt. Info. Sys.5			Dept. Elective5
		Dept. Elective5			Dept. Elective5			Elective5
		Dept. Elective5						

TOTAL — 200 QUARTER HOURS

Economics departmental electives are any EC designated courses except EC 206.

*To be selected from Anthropology, Foreign Language, History, Literature, Philosophy, Political Science, Psychology, or Sociology courses.

Department of Management

The success or failure of any business is dependent upon the quality of its management. Business managers must acquire and effectively utilize physical, financial, and human resources to ensure an organization's survival and development. In order to make sound decisions, the manager must be knowledgeable in basic business functions as well as the process of management.

The professional options within the Management Department are designed to impart knowledge which will assist future managers to be good decision makers for their organizations.

Operations Management (OM)

The Operations Management Program prepares students for a broad range of managerial and staff positions in business. The functional, behavioral, economic and legal aspects of various types of business organizations are studied, utilizing a variety of analytical and conceptual models, tools, and techniques. Electives may be utilized to provide an emphasis in the area of computer information systems, operations management, materials management, service operations management, purchasing, or forest products. Details concerning these emphases are available in the Management Department or Student Affairs Office in the College of Business.

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

First Quarter			JUNIOR YEAR Second Quarter			Third Quarter		
MT	331	Prin. of Mkt.5	MN	346	Org. Behavior4	MN	381	Mgt. Dec. Mak.5
AC	213	Mgt. Cost & Budgt.4	MN	380	Prin. Op. Mgt.4	MN	385	Prod. Mgt.5
MN	310	Prin. of Mgt.5	MN	382	Mgt. Info. Systems5			Approved Elective*5
FI	361	Prin. of Fin.5			Approved Elective*5			

SENIOR YEAR

Elective.....3	EHA 415 Written Bus. Comm.....3	MN 480 Bus. Policies.....5
Elective.....3	MN 387 Mkt. Mgt. II.....5	MN 484 Oper. Mgt. Policies.....5
MN 386 Mkt. Mgt. I.....5	MN 420 Indus. Procurement.....5	Approved Elective*.....5
MN 474 Quality Assurance.....4	Approved Elective*.....5	

TOTAL — 202 QUARTER HOURS

*A minimum of 20 hours of approved electives must be selected from an approved list in the College of Business Student Affairs Office.

Management (MN)

The "Management" Professional Option prepares students to assume managerial and staff responsibilities in business, government, and non-profit organizations. Emphasis is on broad management training rather than specialization in a particular industry. It is an opportunity-oriented program designed for students who wish to develop career flexibility. This program also provides an opportunity for the students to take a concentration option in Management Information Systems or Small Business Management. Students should take SY 201 for 5 of their elective hours in Pre-Business.

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

JUNIOR YEAR

Second Quarter

First Quarter			Third Quarter		
MT 331 Prin. of Mkt.....5	FI 361 Prin. of Finance.....5	FI	Finance Elective*.....5		
AC 213 Mgt. Cost & Bdgt.....4	MN 346 Org. Behavior.....4		Quant. Elective*.....5		
MN 310 Prin. of Mgt.....5	MN 380 Prin. of Oper. Mgt.....4	MT 241	Business Law I.....5		
MN 382 Mgt. Info. Sys.....5	Desig. Elective*.....5				

SENIOR YEAR

Int'l Elective*.....5	MT	Mkt. Elective*.....5	MN 480 Bus. Policies.....5
Econ. Elective*.....5	EHA 415 Written Bus. Comm.....3	MN	Mgt. Elective*.....5
Mgt. Elective*.....4	MN	Mgt. Elective*.....5	MN
MT	FI	Finance Elective*.....5	Mgt. Elective*.....4

TOTAL — 203 QUARTER HOURS

*Electives must be selected from an approved list in the College of Business Office of Student Affairs.

Human Resources Management (HRMN)

The Human Resources Management Program provides a comprehensive education in human resources management. Primary goals are to provide knowledge oriented toward practical, on-the-job applications and prepare students for entry-level positions in private and public sector organizations. Beyond the strong foundation in human resources, opportunities are provided for students to take courses relating to other areas such as information systems, service industry operations, and strategic management. Students should take SY 201 for five of their elective hours in Pre-Business. Details concerning this program are available in the Management Department or Student Affairs Office in the College of Business.

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

JUNIOR YEAR

Second Quarter

First Quarter			Third Quarter		
MT 331 Prin. of Mkt.....5	FI 361 Prin. of Finance.....5	MN 443	Labor Relat.....5		
EC 350 Labor Economics.....5	MN 342 Human Res. Mgt.....5	MN 382	Mgt. Info. Sys.....5		
MN 310 Prin. of Mgt.....5	MN 346 Org. Behavior.....4		Dept. Elective*.....5		
Elective.....3	Elective.....3				

SENIOR YEAR

MN 501 Labor Rel. Law.....5	MN 551 Manpower Plan.....4	MN 480	Bus. Policies.....5
MN 552 Pers. Organ. Res.**.....5	EHA 415 Written Bus. Comm.....3		Dept. Elective*.....5
MN 546 Pers. Adm. Leg.....5	MN 553 Labor Neg. & Arb.**.....5	MN 547	Employee Comp.....5
Elective.....3	MN 550 Pers. Selec. & Pl.....4		

TOTAL — 202 QUARTER HOURS

*A minimum of 10 hours of departmental electives must be selected from the 300, 400 or specified 500-level course offerings of the Department of Management, or from IE 508, PG 420, 431, 515, 516; PO 517; SY 304, 477, 508, 518.

**Students must take at least one of the following courses: MN 552, 553. If so desired, a five-hour departmental elective may be substituted for one of these courses.

General Business — Theatre (GBT)

The General Business-Theatre Professional Option is an interdepartmental program between the Management Department and the Department of Theatre which is administered by the College of Business. It permits students who wish to work in professional theatre to be well grounded in business management and thus able to utilize business skills while developing their theatrical careers.

First Quarter			FRESHMAN YEAR			Third Quarter		
MH	140	College Algebra.....5	MH	161	Anal. Geo. & Cal.....5	MH	169	Bus. Math w/Cal. App.....5
EH	101	English Comp.....3	EH	102	English Comp.....3	EH	103	English Comp.....3
TH	231	Theatre Tech. I.....4	TH	201	Intr. to Theatre.....3	TH	200	Intr. to Act. & Dir.....4
TH	300	Theatre Lab.....1	TH	300	Theatre Lab.....1	TH	261	Costume Constr.....4
TH	100	Theatre Convo.....0	TH	100	Theatre Convo.....0	TH	300	Theatre Lab.....1
						TH	100	Theatre Convo.....0
			Second Quarter					
EC	200	Economics I.....5	EC	202	Economics II.....5	SC	111	Pub. Speaking.....5
PG	212	Psychology.....5	MN	274	Bus. & Ec. Statistics.....5	AC	212	Prin. of Acct. II.....4
TH	240	Theatrical Design.....4	AC	211	Prin. of Acct. I.....4	EHA	315	Report Writing.....3
TH	300	Theatre Lab.....1	TH	271	Play Analysis.....4	TH	371	Hist. of Theatre I.....3
TH	100	Theatre Convo.....0	TH	300	Theatre Lab.....1	TH	300	Theatre Lab.....1
			TH	100	Theatre Convo.....0	TH	100	Theatre Convo.....0
			SOPHOMORE YEAR					
MT	331	Prin. of Mkt.....5	MN	346	Org. Behavior.....4	FI	361	Prin. of Finance.....5
AC	213	Mgt. Cost & Budg.....4	TH	265	Stage Makeup.....3	MT	255	Leg. & Soc. Env.....4
MN	310	Prin. of Mgt.....5	TH	300	Theatre Lab.....1	TH	373	Hist. of Theatre III.....3
TH	372	Hist. of Theatre II.....3	TH	405	Theat. Op./Mgt.....4	TH	300	Theatre Lab.....1
TH	300	Theatre Lab.....1	TH	100	Theatre Convo.....0			Theatre Elective.....4
TH	100	Theatre Convo.....0	MN	382	Mgt. Info. Systems.....5	TH	100	Theatre Convo.....0
			JUNIOR YEAR					
MN	342	Hum. Resou. Mgt.....5	EHA	415	Writ Bus. Comm.....3	MN	480	Bus. Policies.....5
TH	321	Directing: Fund.....4	TH	300	Theatre Lab.....1	TH	300	Theatre Lab.....1
TH	374	Hist. of Theatre IV.....3	TH	100	Theatre Convo.....0	TH	100	Theatre Convo.....0
TH	300	Theatre Lab.....1			Business Elective*.....5			Theatre Elective.....4
TH	100	Theatre Convo.....0			Theatre Elective.....4			Business Elective*.....5
		Business Elective*.....3						
			SENIOR YEAR					

TOTAL — 202 QUARTER HOURS

*Business electives must be selected from the 300, 400 or specified 500-level course offerings of the College of Business.

Department of Marketing and Transportation

The fields of Marketing and of Transportation and Physical Distribution are critical in the effective operation of business in the free world. Students gain the foundation to understand the entire corporate philosophy which affects every phase of the business program — from initial product conception to the delivery of satisfaction to the final customer. Marketing majors discover the interrelationship of marketing to other management tools and prepare themselves for executive/managerial careers involving functional areas such as advertising, channel and product decision-making, pricing, retailing, and strategic market planning. Transportation and Physical Distribution majors complete a course of study which prepares them for careers in carrier, physical distribution, and industrial traffic management and for assignments in urban transportation and development planning, and as traffic and transportation and distribution specialists.

College of Business

Marketing (MK)

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

JUNIOR YEAR

First Quarter			Second Quarter			Third Quarter		
FI	361	Prin. of Finance .....5	MT	336	Quan. Anal. Mkt. ....5	MT	436	Mkt. Research .....5
MT	331	Prin. of Marketing .....5	MT	341	Buyer Behavior .....5	MN	346	Org. Behavior .....4
MN	310	Prin. of Mgt. ....5-5			Elective .....5	MN	382	Mgt. Info. Syst. ....5
		Elective .....5			Elective .....3			Humanities
								Electives* .....3-5
SENIOR YEAR								
EHA	415	Written Bus. Comm. ....3	MN	480	Business Policies .....5	MT	498	Marketing Strategy .....5
		Dept. Elective† .....5			Dept. Elective† .....5			Elective .....5
		Elective .....5-3			Elective .....3			Elective .....5
		Dept. Elective† .....5			Elective .....3			

TOTAL — 206 QUARTER HOURS

Transportation and Physical Distribution (TN)

FRESHMAN AND SOPHOMORE YEARS

(See Pre-Business Program)

JUNIOR YEAR

First Quarter			Second Quarter			Third Quarter		
MT	372	Prin. of Transp. ....5	MT	475	Transp. Reg. &5	MT	373	Intr. Phys. Dist. ....5
MN	310	Prin. of Mgt. ....5			Pub. Pol. ....5	MN	346	Org. Behavior .....4
MT	331	Prin. of Mkt. ....5	FI	361	Prin. of Finance .....5	MN	382	Mgt. Info. Sys. ....5
		Elective .....3	AC	213	Mgt. Cost & Bdgt. ....4			Dept. Elective† .....5
					Elective .....3			
SENIOR YEAR								
EHA	415	Written Bus. Comm. ....3	MT	476	Carrier Mgt. ....5	MN	480	Business Policies .....5
		Dept. Elective† .....5			Directed Elective‡ .....5			Directed Elective‡ .....5
		Elective .....5-3			Elective .....5			Elective .....5
		Humanities			Elective .....4			
		Electives* .....3-5						

TOTAL — 206 QUARTER HOURS

†Departmental Electives may be chosen from the following lists according to student career goals:

Marketing: MT 432, 433, 434, 437, 438, 440, 470, 477, 581, 582, 583, 584, (managerially oriented courses).

Transportation and Physical Distribution: MT 337, 434, 437, 438, 440, 474, 477, 484.

‡Directed Electives may be chosen from business or non-business courses according to career goals upon approval of departmental advisers.

*To be chosen from Anthropology, Economics, Foreign Language, History, Literature, Philosophy, Political Science, Psychology, or Sociology courses.

College of Education

J. BOYD SCEBRA, *Acting Dean*
VIRGINIA HAYES, *Associate Dean*
WILLIAM L. DEATON, *Associate Dean*

THE COLLEGE OF EDUCATION is accredited by the National Council for Accreditation of Teacher Education for the preparation of teachers and school service personnel with the doctor's degree as the highest degree approved.

Emphasis in all programs is upon the preparation of personnel who will be able to meet successfully the performance demands of the roles they assume in their professional positions. An effort is made through processes of Continuous Program Renewal to revise constantly programs based upon systematic evaluative-feedback data secured on the performance of graduates on the job.

Undergraduate Curricula

Teaching and non-teaching programs are offered through the College of Education. Teaching programs are presented first, followed by non-teaching programs.

The following requirements apply to students pursuing a teacher education curriculum. A total of 210 quarter hours is required to complete the program which leads to the degree of Bachelor of Science in Education and Bachelor of Music Education.

Scholastic Requirements

The Selective Admission and Retention Program in Teacher Education — In recognition of responsibilities to the schools in which its graduates teach, the College maintains a program of selective admission and retention of candidates for the teaching profession. This program is designed to assure that no candidates are recommended for admission to the Teacher Education Program, the professional internship or certification unless they are deemed competent in their University studies and professional performance.

A grade point average of 2.5 on Auburn University grades and/or on all transfer work and an ACT score of 16 or SAT score of 745 are required of students transferring into teacher education programs.

The students must submit a formal written application for admission to Teacher Education after completing at least 90 quarter hours of work, usually at the end of the sophomore year. Criteria for admission are:

- (1) a minimum grade point average of at least 2.5 (on a four point scale) on all college work attempted;
- (2) satisfactory performance on a written and spoken English language competency examination;
- (3) satisfactory performance in an interview examining personality, interests, and aptitudes consistent with the requirements for successful teaching;
- (4) a score of at least 16 on the ACT test, which cannot be more than five years old; or a combined score of at least 745 on the SAT, which cannot be more than five years old; and
- (5) successful performance in the pre-professional field experience.

Students who fail to meet these criteria upon initial application may submit new evidence in an effort to satisfy any and/or all of the above standards.

While retention in the Teacher Education Program is based on the continuous evaluation of the students, a formal evaluation takes place as a prerequisite for admission to the professional internship. Requirements for admission to the professional internship are:

- (1) admission to the Teacher Education Program;
- (2) completion of appropriate courses in the area of specialization;
- (3) a grade point average of 2.5 or above on all courses attempted in each of the following: professional teacher education, the teaching major, overall; and
- (4) demonstrated potential for teaching.

In addition, in order to be eligible for graduation with teacher certification, the students will be expected to complete the requirements identified above, to demonstrate readiness to teach through on-the-job performance, and to achieve a grade point average of 2.5 on all college work attempted at Auburn University.

Persons with degrees other than in education may make application for study in a curriculum leading to professional certification, but they will be required to complete the above standards in order to qualify for certification.

Applications and specific information about the criteria of selection for admission to teacher education are available from the Teacher Education Services Office in Haley Center 3464.

Program Options, Teaching

The following Table shows program options available in the College of Education. Some programs are composite, or single major programs; some programs require two teaching majors.

Undergraduate Programs in Education						
	Grade Levels					2nd Major Required
	N-3	1-6	4-8	7-12	N-12	Yes No
Early Childhood			X			X
Elementary Education			X			X
French			X	X		X
German					X	X
Spanish			X	X		X
Language Arts (composite)			X	X		X
English						X
Journalism				X		X
Mathematics (composite)			X	X		X
Mathematics			X			X
General Science (composite)			X	X		X
Biology						X
Chemistry				X		X
Physics				X		X
Social Science (composite)			X	X		X
Economics				X		X
Geography						X
History			X	X		X
Political Science				X		X
Psychology				X		X
Sociology				X		X
Agribusiness						X
Business & Office				X		X
Health Occupations						X
Home Economics			X	X		X
Marketing & Distributive Ed.				X		X
Trade & Industrial				X		X
Physical Education						X
Industrial Arts						X
Music, Instrumental					X	X
Vocal/Choral					X	X
General			N-B-X			X
ECE-Handicapped			X			X
Emotionally Conflicted						X
Mentally Retarded					X	X
Speech Pathology					X	X

Requirements for Fields of Specialization

Requirements are listed below for the teaching fields. Curriculum check lists are available in the Office of Teacher Education Services, 3464 Haley Center.

Courses in the first section are required in all Teacher Education Programs in the College of Education.

Required In All Teacher Education Programs In Education

Common Requirements:

Humanistic and Behavioral Studies: 20 Hrs. — 102 Orientation (1); FED 300 Educational Psychology (5); CCP 322 Human Relations Training in Teacher Education (2); FED 350 Cultural Foundations of Education (5); EDL 401 Organization and Support of Public Education (2); RSE 376 Survey of Exceptionality (5).

Evaluation of Teaching and Learning: 5 Hrs. FED 400 Measurement and Evaluation in Education (5).

Internship: 15 Hrs. — 425 Internship (15).

Additional Requirements in Each Program in Education

EARLY CHILDHOOD, N-3

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature Elective* (3); MU 371 Intr. to Music (3); Approved Speech (3-5); Approved Humanities* Electives (0-2).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Approved Social Science Electives* (6).

Natural and Physical Science and Mathematics: 20 Hrs. BI 105 Perspectives in Biology (5); MH 281, 282 Elementary Mathematics (10); PHS 100 or 101 Physical Science (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Elective (2).

Electives: 26 Hrs. Approved Electives* (26).

Curriculum and Teaching and Media: 22 Hrs. EM 200 Educational Media (2); CTC 320 and 420 Early Childhood Curriculum I and II (20).

Reading: 10 Hrs. CTR 370, 371 Fundamentals of Reading Instruction I and II (10).

Area of Specialization: 41 Hrs. HHP 211 Sensorimotor Activities (3); HHP 394 Methods of Health Instruction (3); AT 301 Elementary School Art (5); EM 510 Media for Children (4); CD 450 Principles of Speech-Language Pathology (5); CTM 304 Music and Related Arts (5); TH 305 Creative Dramatics, or the 306 Children's Theatre (3); FCD 270 Structure and Function of Family (4); FCD 467 Parent Education (4); FCD 301 Human Development III (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

ELEMENTARY 1-6

Common Requirements (40). See above.

Humanities and Fine Arts: 26 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature Elective* (9); MU 371 Introduction to Music (3); Approved Speech Elective* (5).

Social Sciences: 24 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); GY 102 World Geography (5); Approved Social Science Electives* (5).

Natural and Physical Science and Mathematics: 25 Hrs. BI 105 Perspectives in Biology (5); PHS 100 — PHS 101 Introductory Physical Science (10); MH 281, 282 Elementary Mathematics (10).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Elective (2).

Electives: 11 Hrs. Approved Electives* (11).

Curriculum and Teaching and Media: 22 Hrs. EM 200 Ed. Media (2); CTE 302 Curriculum I, Language Arts (5); CTE 303 Curriculum I, Social Science (5); CTE 402 Curriculum II, Math (5); CTE 403 Curriculum II, Natural Science (5).

Reading: 10 Hrs. CTR 370, 371 Fundamentals of Reading Instruction I and II (10).

Area of Specialization: 45 Hrs. HHP 394 Methods of Health Instruction (3); HHP 413 Teaching PE in Elementary School (3); AT 301 Elementary School Art (5); EM 510 Media for Children (4); CD 450 Principles of Speech-Language Pathology (5); CTM 304 Music and Related Arts (5); Concentration (20).

*See Departmental Adviser for Approval of Electives prior to enrolling.

FRENCH, 4-8

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature Elective* (3); Fine Arts Elective from AT, MU and/or TH (1-3); Humanities Elective from FL, or second major when possible (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from FL or second major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Ed. Media (2); CTD 419 The Middle School (5); CTS 405 Teaching Foreign Language (3); CTS 410 Program in Foreign Languages (3); Teaching and Program in second major (6).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 48 Hrs. FL 121, 122, 123, First Year French (15); FL 221, 222, 223 Second Year French (15); FL 321 Conversation and Phonetics (3); FL 322 Composition (3); FL 323 Civilization (3); Approved FL French Electives* (9).

*See Departmental Adviser for Approval of Electives prior to enrolling.

FRENCH 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective* from AT, MU, TH (1-3); Humanities Electives* from FL or second major when possible (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives* from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from FL or second major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Foreign Language (3); CTS 410 Program in Foreign Languages (3); Teaching and Program in second major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 48 Hrs. FL 121, 122, 123, First Year French (15); FL 221, 222, 223 Second Year French (15); FL 321 Conversation and Phonetics (3); FL 322 Composition (3); FL 323 Civilization (3); Approved FL French Electives* (9).

*See Department Adviser for Approval of Electives prior to enrolling.

GERMAN, 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Humanities Electives from FL or second major when possible (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from FL or second major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Foreign Language (3); CTS 410 Program in Foreign Languages (3); Teaching and Program in second major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 48 Hrs. FL 151, 152, 153, First Year German (15); FL 251, 252, 253 Second Year German (15); FL 351 Conversation and Phonetics (3); FL 352 Composition (3); FL 353 Civilization (3); Approved FL German Electives* (9).

*See Departmental Adviser for Approval of Electives prior to enrolling.

SPANISH, 4-8**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Humanities Electives from FL or second major when possible (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Elective (2).

Electives: 26 Hrs. May select from FL or second major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTD 419 The Middle School (5); CTS 405 Teaching Foreign Language (3); CTS 410 Program in Foreign Languages (3); Teaching and Program in second major (6).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 48 Hrs. FL 131, 132, 133, First Year Spanish (15); FL 231, 232, 233 Second Year Spanish (15); FL 331 Conversation and Phonetics (3); FL 332 Composition (3); FL 333 Civilization (3); Approved FL Spanish Electives* (9).

*See Departmental Adviser for Approval of Electives prior to enrolling.

SPANISH, 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Humanities Electives from FL or second major when possible (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Elective (2).

Electives: 26 Hrs. May select from FL or second major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Foreign Language (3); CTS 410 Program in Foreign Languages (3); Teaching and Program in second major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 48 Hrs. FL 131, 132, 133, First Year Spanish (15); FL 231, 232, 233 Second Year Spanish (15); FL 331 Conversation and Phonetics (3); FL 352 Composition (3); FL 333 Civilization (3); Approved FL Spanish Electives* (9).

*See Departmental Adviser for Approval of Electives prior to enrolling.

LANGUAGE ARTS, 4-8 (Composite)

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3); Fine Arts Electives* in TH (1-3); Humanities Electives* from EH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, ZY, VM (4-5); Physical Science Elective* from PHS, PS, CH, GL, AM, AY (4-5); Mathematics Elective* (4-5); Mathematics and/or Science Electives* (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from Area of Specialization (26).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Educational Media (2); CTD 419 The Middle School (5); CTS 411, 412, 413 Teaching English (9).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 80 Hrs. CTS 501 Language Study for Teachers (4-5); CTS 502 Rhetoric & Composition for Teachers (4-5); CTR 576 Reading of Adolescents (4-5); EH 390 Advanced Composition (5); American Literature Survey or Period Courses (5); English and/or World Literature Survey (5); EH 470 or EH 471 Shakespeare (5); EH 391 Contemporary Rhetoric or EH 393 Introduction to Linguistics or EH 541 History of the English Language or EH 594 Modern English Grammars (5); Approved 300-500 Level EH Electives* (20-23); Approved TH Electives* (8); CTS 201P and CTS 201L Communication Problems (3); SC 111 Public Speaking or SC 141 Group Problem Solving Through Discussion or SC 320 Fundamentals of Oral Interpretation of Literature (5); Approved JM Elective* (4).

*See Departmental Adviser for Approval of Electives prior to enrolling.

LANGUAGE ARTS, 7-12 (Composite)

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3); Fine Arts Electives* in TH (1-3); Humanities Electives* from EH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, ZY, VM (4-5); Physical Science Elective* from PHS, PS, CH, GL, AM, AY (4-5); Mathematics Elective* (4-5); Mathematics and/or Science Electives* (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from Area of Specialization (26).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 411, 412, 413 Teaching English (9).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 80 Hrs. CTS 501 Language Study for Teachers (5); CTS 502 Rhetoric & Composition for Teachers (5); CTR 576 Reading of Adolescents (4-5); EH 390 Advanced Composition (5); American Literature Survey or Period Courses (5); English and/or World Literature Survey (5); EH 470 or EH 471 Shakespeare (5); EH 391 Contemporary Rhetoric or EH 393 Introduction to Linguistics or EH 541 History of the English Language or EH 594 Modern English Grammars (5); Approved 300-500 Level EH Electives* (20-23); Approved TH Electives* (8); CTS 201P and CTS 201L Communication Problems (3); SC 111 Public Speaking or SC 141 Group Problem Solving Through Discussion or SC 320 Fundamentals of Oral Interpretation of Literature (5); Approved JM Elective* (4).

*See Departmental Adviser for Approval of Electives prior to enrolling.

ENGLISH, 4-8

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3); Fine Arts Elective* from AT, MU, TH (1-3); Humanities Electives* from EH or Second Major (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, ZY, VM (4-5); Physical Science Elective* from PHS, PS, CH, GL, AM, AY (4-5); Mathematics Elective* (4-5); Mathematics and/or Science Electives* (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from Area of Specialization or Second Major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTD 419 The Middle School (5); Select two from CTS 411, 412, 413 Teaching English (6); Teaching and Program in Second Major (6).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. CTS 501 Language Study for Teachers (5); CTS 502 Rhetoric & Composition for Teachers (5); CTR 576 Reading of Adolescents (5); EH 390 Advanced Composition (5); EH 470 or EH 471 Shakespeare (5); American Literature Survey or Period Courses (5); English and/or World Literature (5); Approved 300-500 Level EH Electives* (10-13).

*See Departmental Adviser for Approval of Electives prior to enrolling.

ENGLISH, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3); Fine Arts Elective* from AT, MU, TH (1-3); Humanities Electives* from EH or Second Major (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, ZY, VM (4-5); Physical Science Elective* from PHS, PS, CH, GL, AM, AY (4-5); Mathematics Elective* (4-5); Mathematics and/or Science Electives* (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from Area of Specialization or Second Major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); Select two from CTS 411, 412, 413 Teaching English (6); Teaching and Program in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. CTS 501 Language Study for Teachers (5); CTS 502 Rhetoric & Composition for Teachers (5); CTR 576 Reading of Adolescents (5); EH 390 Advanced Composition (5); EH 470 or EH 471 Shakespeare (5); American Literature Survey or Period Courses (5); English and/or World Literature (5); Approved 300-500 Level EH Electives* (10-13).

*See Departmental Adviser for Approval of Electives prior to enrolling.

JOURNALISM, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3); Fine Arts Elective* from AT, MU, TH (1-3); Humanities Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, ZY, VM (4-5); Physical Science Elective* from PHS, PS, CH, GL, AM, AY (4-5); Mathematics Elective* (4-5); Math and/or Science Electives* (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. May select from Area of Specialization or Second Major (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Journalism (3); CTS 410 Program in Journalism (3); Teaching and Program in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 43 Hrs. EH 390 Advanced Composition (5); JM 101 Newspaper Style (3); JM 221 Newswriting (5); JM 313 Reporting (5); JM 314 Copyreading & Editing (5); JM 465 History & Principles of Journalism (5); SC 338 Broadcast Newswriting (5); JM 421 Photo-Journalism (5); CTS 495 Practicum (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MATHEMATICS, 4-8 (Composite)**

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective* from AT, MU, TH (1-3); Hum. Electives from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, VM, ZY (5); Physical Science Elective* from CH 101 or 102 or 103 Chemistry or GL 101 Introductory Geology or PS 205 Introductory Physics or PHS 100 Introductory Physical Science (5); MH 161, 162 Analytical Geometry & Calculus (10).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Elective (2).

Electives: 26 Hrs. Approved Electives* (26).

Curriculum and Teaching and Media: 20 Hrs. EM 200 Educational Media (2); CTD 419 The Middle School (5); CTD 401 Teaching Mathematics in the Middle School (4); CTS 402, 403 Mathematics Program and Teaching I and II (6); CTS 404 Teaching Mathematics: Applications and Techniques (3).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 65 Hrs. MH 161, 162, 163 Analytic Geometry/Calculus (15); CTS 204 Fund. of Computer Programming (3); MH 264 Analytic Geometry/Calculus (5); MH 265 Linear Differential Equations (3); MH 266 Linear Algebra (3); MH 301 History of Mathematics (3); MH 331 Modern Algebra (5); MH 541 Geometry: A Modern View (5); MH 567 Probability Theory (5); Approved MH Electives* (15-18); Approved Computer Science Elective (0-3) (Credit not allowed for MH 140, 151, 281, 282).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MATHEMATICS, 4-8

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective* from AT, MU, TH (1-3); Hum. Electives from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, VM, ZY (5); Physical Science Elective* from PHS, CH, PS, GL, AM, AY (5); MH 161, 162 Analytic Geometry and Calculus (10).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Elective (2).

Electives: 26 Hrs. May select from MH or second major (26).

Curriculum and Teaching and Media: 20 Hrs. EM 200 Educational Media (2); CTD 419 The Middle School (5); CTD 401 Teaching Mathematics in the Middle School (4); CTS 402 Mathematics Program and Teaching I (3); Teaching and Program in Second Major (6).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 47 Hrs. MH 161, 162, 163 Analytic Geometry/Calculus (15); CTS 204 Fund. of Computer Programming (3); MH 264 Analytic Geometry/Calculus (5); MH 265 Linear Differential Equations (3); MH 266 Linear Algebra (3); MH 301 History of Mathematics (3); MH 331 Modern Algebra (5); MH 541 Geometry: A Modern View (5); MH 567 Probability Theory (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MATHEMATICS, 7-12 (Composite)**

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective* from AT, MU, TH (1-3); Hum. Electives from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, VM, ZY (5); Physical Science Elective* from CH 101 or 102 or 103 Chemistry or GL 101 Introductory Geology or PS 205 Introductory Physics or PHS 100 Introductory Physical Science (5); MH 161, 162 Analytical Geometry & Calculus (10).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (26).

Curriculum and Teaching and Media: 17 Hrs. EM 200 Educational Media (2); CTD 401 Teaching Mathematics in the Middle School (4); CTS 403 Mathematics Program and Teaching II (3); CTS 402 Mathematics Program and Teaching I or CTS 404 Teaching Mathematics: Applications & Techniques (3); CTS 420 The Secondary School (5).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 65 Hrs. MH 161, 162, 163 Analytic Geometry/Calculus (15); CTS 204 Fund. of Computer Programming (3); MH 264 Analytic Geometry/Calculus (5); MH 265 Linear Differential Equations (3); MH 266 Linear Algebra (3); MH 301 History of Mathematics (3); MH 331 Modern Algebra (5); MH 541 Geometry: A Modern View (5); MHC 567 Probability Theory (5); Approved MH Electives* (15-18); Approved Computer Science Elective (0-3) (Credit not allowed for MH 140, 151, 281, 282).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MATHEMATICS, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective* from AT, MU, TH (1-3); Hum. Electives from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives from AT 171, 172, 173 Art History, ANT, EC, GY, HY, PO, PG, SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, VM, ZY (5); Physical Science Elective* from PHS, CH, PS, GL, AM, AY (5); MH 161, 162 Analytic Geometry and Calculus (10).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Elective (2).

Electives: 26 Hrs. Electives* from MH or second major (26).

Curriculum and Teaching and Media: 20 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTD 401 Teaching Mathematics in the Middle School (4); CTS 403 Mathematics Program and Teaching II (3); Teaching and Program in Second Major (6).

Reading: 5 Hrs. CTR 571 Teaching Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 47 Hrs. MH 161, 162, 163 Analytic Geometry/Calculus (15); CTS 204 Fund. of Computer Programming (3); MH 264 Analytic Geometry/Calculus (5); MH 265 Linear Differential Equations (3); MH 266 Linear Algebra (3); MH 301 History of Mathematics (3); MH 331 Modern Algebra (5); MH 541 Geometry: A Modern View (5); MHC 567 Probability Theory (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

GENERAL SCIENCE, 4-8 (Composite)

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); MH 160 Pre-Calculus with Trigonometry or MH 161 Analytical Geometry with Calculus (5); Mathematics and/or Science Elective (5-7).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Educational Media (2); CTD 419 The Middle School (5); CTS 405 Teaching Science (3); CTS 410 Program in Science (3); CTS 415 Current Trends and Practices in Science (3).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 65 Hrs. BI 101 Principles of Biology (5); BI 102 Plant Biology (5); BI 103 Animal Biology (5); CH 103, 104 Fundamentals of Chemistry (10); CH 207 Organic Chemistry (5); PS 205, 206, 207 (12); PS 215 Astronomy (5); GL 101, 102 Introduction to Geology I, II (10); AM 304 Meteorology (5); Approved Electives* from BI, CH, PS, or Earth and Space Science (3).

*See Departmental Adviser for Approval of Electives prior to enrolling.

GENERAL SCIENCE, 7-12 (Composite)

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); MH 161 Analytical Geometry with Calculus (5); Math and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Science (3); CTS 410 Program in Science (3); CTS 415 Current Trends and Practices in Science (3).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 90 Hrs. BI 101 Principles of Biology (5); BI 102 Plant Biology (5); BI Electives*, 300 level or above (10); CH 103, 104 Fundamentals of Chemistry (10); CH Electives* (10); PS 205, 206, 207 (12); PS Elective or 500 level PHS Electives (8); GL 101, 102 Introduction to Geology I, II (10); Approved Earth and Space Science Electives*, 300 level or above (10); Required: 30-hour concentration in one of the areas BI, CH, PS, GL/Earth and Space Science.

*See Department Adviser for Approval of Electives prior to enrolling.

BIOLOGY, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Science and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); CH 103, 104 Fundamentals of Chemistry (10); MH 160 Pre-Calculus with Trigonometry or MH 161 Analytical Geometry and Calculus (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Science (3); CTS 410 Program in Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. BI 101 Principles of Biology (5); BI 102 Plant Biology (5); BI 103 Animal Biology (5); Physiology Elective* (5); ZY 300 Genetics (5); Approved courses 300 level or above from BY and/or ZY (15); Organic Chemistry Elective* (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

CHEMISTRY, 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 22 Hrs. Natural Science from BI, BY, ZY, VM (5); PH 205, 206, 207 Introductory Physics (12); MH 162 Analytic Geometry and Calculus (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Science (3); CTS 410 Program in Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 40 Hrs. CH 103, 104, 105 Fundamentals of Chemistry I, II, III (15); CH 207, 208 Organic Chemistry (10); CH 301 Biochemistry (5); Approved CH Electives* 300 level or above (10).

*See Departmental Adviser for Approval of Electives prior to enrolling.

PHYSICS, 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); CH 103, 104 Fundamentals of Chemistry (10); MH 161 Analytic Geometry and Calculus (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Science (3); CTS 410 Program in Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 40 Hrs. PS 220, 221, 222 PHYSICS I, II, III (12); PS 300, 301 Electricity & Magnetism I, II (8); PS 302 Electronics (4); PS 303 Optics (4); Approved PS Courses* 300 level or above (12).

Physics Majors Must Complete A Second Major In Mathematics, Including MH 501.

*See Departmental Adviser for Approval of Electives prior to enrolling.

GENERAL SOCIAL SCIENCE, 4-8 (Composite)**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PH5, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Ed. Media (2); CTD 419 The Middle School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); CTS 415 Current Trends & Practice in Social Science (3).

Reading: 10 Hrs. CTR 370 Fund. of Reading (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 69 Hrs. HY 101, 102, 103 World History (9); Approved* 300 level or above courses in U.S. History (10); PO 209 Introduction to American Government (5); PO 312 Introduction to Comparative Government (5); PO Elective* (3); GY 214 Physical Geography (5); GY 215 Cultural Geography (5); EC 200 Economics I (5); Approved* 300-500 level Economics Electives (5); SY 201 Introduction to Sociology (5); PG 211 Psychology (5); ANT 203 Introduction to Anthropology (5); Electives* in Social/Behavioral Sciences (2).

*See Departmental Adviser for Approval of Electives prior to enrolling.

GENERAL SOCIAL SCIENCE, 7-12 (Composite)**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PH5, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching Media: 16 Hrs. EM 200 Ed. Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); CTS 415 Current Trends & Practice in Social Science (3).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 80 Hrs. Approved European History (5); Approved Asian History (5); Approved 300 level or above courses in U.S. History (10); Approved Latin American, Asian and/or African History (4); PO 209 Introduction to American Government (5); PO 312 Introduction to Comparative Government (5); PO Elective* (3); GY 214 Physical Geography (5); GY 215 Cultural Geography (5); EC 200 Economics I (5); EC 206 Socio-Economic Foundations of Contemporary America (3); SY 201 Introduction to Sociology (5); SY 202 Social Problems (5); PG 211 Psychology (5); ANT 203 Introduction to Anthropology (5); CTS 421 Social Science Concepts (5); Electives* in Social/Behavioral Sciences (0-1).

*See Departmental Adviser for Approval of Electives prior to enrolling.

ECONOMICS, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. EC 200 and EC 202 Economics I, II (10); CTS 421 Social Science Concepts (5); Approved Economics Courses* to include 15 hours at 300 level or above (30).

*See Departmental Adviser for Approval of Electives prior to enrolling.

GEOGRAPHY, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. GY 214 Physical Geography (5); GY 215 Cultural Geography (5); CTS 421 Social Science Concepts (5); Approved Geography Courses* to include 10 hours at 300 level or above (30).

*See Departmental Adviser for Approval of Electives prior to enrolling.

HISTORY, 4-8

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTD 419 The Middle School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); Program and Teaching in Second Major (6).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. HY 101, 102, 103 World History (9); HY 201, 202 History of the United States (10); Approved* Latin American, Asian, and/or African History (3-5); CTS 421 Social Science Concepts (5); Approved History Courses* to include 10 hours at 300 level or above (16-18).

*See Departmental Adviser for Approval of Electives prior to enrolling.

HISTORY, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. HY 101, 102, 103 World History (9); HY 201, 202 History of the United States (10); Approved* Latin American, Asian, and/or African History (3-5); CTS 421 Social Science Concepts (5); Approved History Courses* to include 10 hours at 300 level or above (16-18).

*See Departmental Adviser for Approval of Electives prior to enrolling.

POLITICAL SCIENCE, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. PO 209 American Government (5); PO 210 State and Local Government (5); PO 312 Comparative Government (5); CTS 421 Social Science Concepts (5); Approved Political Science Courses* to include 10 hours at 300 level or above (25).

*See Departmental Adviser for Approval of Electives prior to enrolling.

PSYCHOLOGY, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. PG 211 Psychology (5); PG 330 Social Psychology (4-5); CTS 421 Social Science Concepts (5); Approved Psychology Courses* to include 15 hours at 300 level or above (30-31).

*See Departmental Adviser for Approval of Electives prior to enrolling.

SOCIOLOGY, 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 19 Hrs. EM 200 Educational Media (2); CTS 420 The Secondary School (5); CTS 405 Teaching Social Science (3); CTS 410 Program in Social Science (3); Program and Teaching in Second Major (6).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 45 Hrs. SY 201 Introduction to Sociology (5); SY 202 Social Problems (5); CTS 421 Social Science Concepts (5); Approved Sociology Courses* to include 10 hours at 300 level or above (30).

*See Departmental Adviser for Approval of Electives prior to enrolling.

AGRIBUSINESS 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved SC Elective* (3); Approved Literature Elective* (1-3); AT, MU, TH Elective* (1-3); Humanities Electives* (2-6).

Social Sciences: 20 Hrs. EC 200 Economics or AEC 202 Ag. Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Approved Social Science Electives* from EC, GY, HY, PO, PG, or SY (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY (5); Approved Chemistry Electives* (10); Approved Mathematics* (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: VED 346 Vocational & Adult Education or VED 541 Development of Vocational Education (3-4); Electives* (22-23).

Curriculum and Teaching and Media: 10 Hrs. EM 200 Educational Media (2); VED 414 Program in Area of Specialization (3); VED 415 Teaching in Area of Specialization (5).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 75 Hrs. ADS 200 Introduction to Animal and Dairy Science (5); HF 202 Fruit & Vegetable Production (5); HF 221 Landscape Gardening (5); AY 307 General Soils (5); AEC 301 Agricultural Marketing (5); AEC 210 Microcomputers in Agriculture (3); AEC 501 Farm Management (5); ZY 502 Economic Entomology (5); VED 408 General Shop (5); VED 404 General Metals or VED 406 Building Construction or VED 407 Electricity (5); Poultry/FY/Approved Electives (5); Approved Electives* in Area of Specialization (22).

*See Departmental Adviser for Approval of Electives prior to enrolling.

BUSINESS EDUCATION, 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3-5); Approved Speech* (3-5); Approved AT, MU, TH* (1-3); Approved Humanities Electives* (0-4).

Social Sciences: 20 Hrs. EC 200 and EC 202 Economics (10); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Social Science Elective* (1).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science Elective* from BI, BY, ZY, VM (4-5); Physical Science Elective* from PHS, PS, CH, GL, AM, AY (4-5); Math Elective* (4-5); Math and/or Science Electives* (5-8).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: VED 346 Vocational and Adult Education or VED 541 Development of Vocational Education (3-4); VED 574 Organization of Instruction (5); VED 558 Coordination and Supervision (5); Electives (12-13).

Curriculum and Teaching and Media: 10 Hrs. EM 200 Educational Media (2); VED 414 Program in Area of Specialization (3); VED 415 Teaching in Area of Specialization (5).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 75 Hrs. EC 200 and EC 202 Economics I, II (10); VED 302 Advanced Keyboard Applications (5); VED 312 Shorthand/Transcription (5); ACF 211 and ACF 212 Accounting (8); MN 207 Introduction to Computer Programming or EM 370 Microcomputer in Education (3-4); MN 310 Principles of Management (4); FI 340 Personal Finance or CA 323 Man the Consumer (3); MT 241 Business Law I (4); VED 420 Introduction to Information Processing (5); VED 440 Electronic Office Procedures (5); EH 415 Written Business Communications (3); VED 462/421 Directed Work/ Internship (5-10); Approved Electives* in the Area of Specialization (9-15).

*See Departmental Adviser for Approval of Electives prior to enrolling.

HEALTH OCCUPATIONS, 7-12**Common Requirements (40). See above.**

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3-5); Approved Speech* (3-5); Approved AT, MU, TH* (1-3); Approved Humanities Electives* (0-4).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives in Social Science* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (10); Physical Science from AM, AY, CH, GL, PHS, PS (5); Mathematics Elective* (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: VED 346 Vocational and Adult Education or VED 541 Development of Vocational Education (3-4); VED 558 Coordination & Supervision of Vocational Education (5); EM 370 Microcomputer in Education (4); FCD 269, 270, 477 (11); Electives* (11).

Curriculum and Teaching and Media: 10 Hrs. EM 200 Educational Media (2); VED 414 Program in Area of Specialization (3); VED 415 Teaching in Area of Specialization (5).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 75 Hrs. VED 352 Medical Terminology for Health Related Occupations (5); VED 354 Careers in Health Related Occupations (5); VED 356 Health Delivery Systems (5); VED 495 Practicum in Health Occupations (12); VED 462 Directed Work Experience in Health Occupations (5); VED 475-480 Trade and Technical Experience (30); HHP 509 Advanced Health Science (5); NF 200 Nutrition and Man or NF 358 Community and Family Health or NF 362 Problems in Community Nutrition or NF 578 Modern Views of Nutrition or NF 582 Teaching Nutrition to Children in Schools (3); Approved Electives* in the Area of Specialization to total 75 Hours.

*See Departmental Adviser for Approval of Electives prior to enrolling.

HOME ECONOMICS, 4-8**Common Requirements (40).** See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3-5); Approved Speech* (3-5); Approved AT, MU, TH* (1-3); Approved Humanities Electives* (0-4).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives in Social Science* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (10); Physical Science from AM, AY, CH, GL, PHS, PS (5); Mathematics Elective* (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: VED 346 Vocational and Adult Education or VED 541 Development of Vocational Education (3-4); Electives* (22-23).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Educational Media (2); VED 411 Teaching Home Economics Education (5); VED 410 Programs in Home Economics for the Middle School (4); VED 550 Career Education (5).

Reading: 10 Hrs. CTR 370 Fundamentals of Reading Instruction I (5); CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 70 Hrs. CA 105 Fundamentals of Clothing (5); CA 113 Housing for Man (3); CA 115 Clothing for Man (3); CA 116 Art for Living (3); CA 116L Art for Living Lab (2); CA 206 Garment Structure (3); CA 233 Home Equipment (5); CA 323 Man the Consumer (3); CA 343 Interior Home Problems (5); CA 443 Family Resource Management Residence (5); FCD 269 Family I (4); FCD 270 Family II (4); FCD 330 Lifespan Human Development (5); FCD 467 Parent Education (4); NF 200 Nutrition & Health (3); NF 202 Principles of Food Preparation (5); NF 204 Food Management for the Consumer (5); Elective* from CA/FCD/NF (3).

*See Departmental Adviser for Approval of Electives prior to enrolling.

HOME ECONOMICS, 7-12**Common Requirements (40).** See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (3-5); Approved Speech* (3-5); Approved AT, MU, TH* (1-3); Approved Humanities Electives* (0-4).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives in Social Science* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (10); Physical Science from AM, AY, CH, GL, PHS, PS (5); Mathematics Elective* (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: VED 346 Vocational and Adult Education or VED 541 Development of Vocational Education (3-4); Electives* (22-23).

Curriculum and Teaching and Media: 10 Hrs. EM 200 Educational Media (2); VED 411 Teaching Home Economics Education (5); VED 412 Programs in Home Economics (4).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 78 Hrs. CA 105 Fundamentals of Clothing (5); CA 113 Housing for Man (3); CA 115 Clothing for Man (3); CA 116 Art for Living (3); CA 204 Commercial Apparel Production (3); CA 206 Garment Structure (3); CA 222 Furnishings for Interiors (5); CA 233 Home Equipment (5); CA 323 Man the Consumer (3); CA 431 Man Envir. Relations (2); CA 443 Family Resource Management Residence (5); FCD 269 Family I (4); FCD 270 Family II (4); FCD 330 Lifespan Human Dev. (5); FCD 467 Parent Ed. (4); NF 200 Nutrition & Health (3); NF 202 Principles of Food Preparation (5); NF 204 Food Management for the Consumer (5); NF 304 Quantity Food Preparation (5); VED 462 Directed Work Experience (3).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MARKETING EDUCATION, 7-12****Common Requirements (40).** See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (1-3); Approved Speech* (3); Approved AT, MU, TH* (1-3); Approved Humanities Electives* (2-6).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives in Social Science* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); Physical Science from PHS, PS, CH, GL, AM, AY (5); Mathematics and/or Science Elective (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: VED 346 Vocational and Adult Education or VED 541 Development of Vocational Education (3-4); Electives* (22-23).

Curriculum and Teaching and Media: 10 Hrs. EM 200 Educational Media (2); VED 414 Program in Area of Specialization (3); VED 415 Teaching in Area of Specialization (5).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 70 Hrs. EC 200 and EC 202 Economics I, II (10); MN 310 Principles of Management (3); FI 340 Personal Finance or AC 211 Accounting I (3); MT 331 Principles of Marketing (5); Select one from: EC 350 Labor Economics; MN 420 Industrial Procurement; MN 380 Principles of Operations Management; MN 415 Small Business Management; MN 500 Industrial Relations (5); Select one from: MT 241 Business Law I; MT 242 Business Law II; MT 255 Legal and Social Environment of Business; MN 346 Organizational Behavior; CA 344 Environ. Law (4); Select one from MT 337 Fundamentals of Salesmanship; MN 440 Organization Theory; CA 325 Fashion Merchandising; MN 442 Personnel Management (5); Select one from MT 333 Merchandising Management; MT 433 Retail Store Management; MT 440 International Marketing (5); Select one from: MT 438 Marketing Channel Systems; MT 372 Economics of Transportation; MT 473 Physical Distribution Management (5); Select one from: MT 332 Marketing Communication Management; MT 341 Buyer Behavior; MT 432 Promotional Strategy; MT 437 Sales Management (5); VED 462 Directed Work Experience

or One Year Documented Work Experience (0-5); VED 510 Occupational Information (5); VED 556 Learning Resources (5); VED 558 Coordination and Supervision in Vocational Programs (5); Approved Electives* in Area of Specialization to total 70 hours in program.

*See Departmental Adviser for Approval of Electives prior to enrolling.

**Not more than 25 percent of the required hours for graduation may be taken in courses offered by the College of Business.

INDUSTRIAL 7-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Approved Literature* (1-3); Approved Speech* (3); Approved AT, MU, TH* (1-3); Approved Humanities Electives* (2-6).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives* in Social Science (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); Physical Science from PHS, PS, CH, GL, AM, AY (5); Mathematics (5); Mathematics and/or Science Elective (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: VED 346 Vocational and Adult Education or VED 541 Development of Vocational Education (3-4); VED 466 Teaching Out of School Groups (3); VED 556 Learning Resources (5); Electives* (14-15).

Curriculum and Teaching and Media: 10 Hrs. EM 200 Educational Media (2); VED 414 Program in Area of Specialization (3); VED 415 Teaching in Area of Specialization (5).

Reading: 5 Hrs. CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 55 Hrs. MN 310 Principles of Management (4); VED 405 The School Shop (3); VED 462 Directed Work Experience (1-15); MN 500 Industrial Relations (5); VED 510 Occupational Information or VED 550 Career Education (3-4); VED 558 Coordination of Trade & Industrial Education (5); VED 574 Organization of Instruction in Vocational and Adult Education (5); Select 15-30 Hours from: EC 200 Economics I (5); EC 202 Economics II (5); VED 246 Instructional Drawing (3); EC 350 Labor Economics (5); VED 400 Introduction to Power Mechanics (5); VED 401 Practicum in Small Gasoline Engines (5); VED 402 Automotive Construction & Repair (5); VED 403 Principles of Electricity (1); VED 404 Practicum in General Metals (5); VED 406 Practicum in Building Construction & Maintenance (5); VED 407 Practicum in Electricity (4); VED 408 Practicum in General Shop (5); VED 409 Teaching Electronics (4); VED 457 Practicum in Graphics Arts Instruction (3); VED 475-480 Trade and Technical Experience (5); SY 508 Industrial Sociology (5); SY 511 Technology and Social Change (3); SY 518 Sociology of Occupations (5); VED 524 Administrative Management (5); VED 552 Instructional Programs in the Construction Industry (4); VED 554 Instructional Programs in the Manufacturing Industry (4); EC 555 Industrial Organization (5); PG 561 Industrial Psychology (5); PG 562 Training & Supervision of Industrial Personnel (3); PG 563 Interviewing & Classifying Industrial Personnel (3); EC 568 Business History of the United States (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

PHYSICAL EDUCATION, N-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Electives* (9); Fine Arts from MU, AT, TH or Dance (2).

Social Sciences: 24 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); PG 211 Psychology (5); SY 201 Introduction to Sociology (5).

Natural and Physical Sciences and Mathematics: 25 Hrs. BI 101 Principles of Biology or BI 105 Perspectives in Biology (5); ZY 250 Anatomy (5); ZY 251 Physiology (5); Approved* Mathematics (5); Physical Science from PHS, PS, CH, GL, AM, AY (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE 101 Physical Fitness, Self Appraisal (2).

Electives: 17 Hrs. Required: SC 140 Speech (3); NF 200 Nutrition & Health (3); Electives* (11).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Educational Media (2); HHP 413 Teaching PE in Elementary School (3); HHP 414 Teaching PE (3); HHP 423 Program in Physical Education (5); HHP 426 Evaluation and Measurement in Physical Education (3).

Reading: 5 Hrs. CTR 570 Reading in the Content Areas of the Elementary School or CTP 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 60 Hrs. HHP 100 Fundamentals of Movement (3); HHP 118 and 119 Skills & Concepts Individual Activities I and II (6); HHP 120 Skills and Concepts of Gymnastics (3); HHP 121 Skills & Concepts of Aquatics (2); HHP 122 and 124 Skills & Concepts Team Sports I & II (5); HHP 123 Skills & Concepts Dance (3); HHP 200 Theory and Conduct of Physical Activities (5); HHP 201 History and Principles of Physical Education (3); HHP 211 Motor Development (3); HHP 315 Kinesiology (4); HHP 404 Athletic Injuries (3); HHP 405 Physiology of Exercise (4); HHP 416 Adaptive PE (3); HHP 429 Motor Learning and Performance (4); HHP 494 Emergency Care and First Aid (3); PE 135 Weight Training (2); Approved HHP Electives* (4).

*See Departmental Adviser for Approval of Electives prior to enrolling.

INDUSTRIAL ARTS, N-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3-5); Approved SC Elective* (3-5); Fine Arts Elective* from AT, MU, CA 116, TH (1-3); Humanities Electives* (0-4).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology and Civilization (9); Social Science Electives* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); Physical Science from PHS, PS, CH (5); Mathematics (5); Mathematics and/or Science Elective (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).
Electives: 26 Hrs. Required: VED 346 (3); Approved Electives* May Include Courses from Area of Specialization (23).
Curriculum and Teaching and Media: 15 Hrs. EM 200 Educational Media (2); VED 414 Program in Area of Specialization (3); VED 415 Teaching in Area of Specialization (5); VED 556 Learning Resources in Area of Specialization (5).
Reading: 5 Hrs. CRT 571 Reading in the Content Areas of the Secondary School (5).
Area of Specialization: 73 Hrs. IE 102 Graphic Communications and Design (3); IE 105 Engineering Drawing II (2); VED 216 Plastics Technology (2); VED 246 Instructional Drawing (3); VED 301 Practicum in Woodworking (3); VED 400 Introduction to Power Mechanics (3); VED 401 Practicum in Small Gasoline Engines (3); VED 402 Automobile Construction and Repair (3); VED 404 Practicum in General Metals (3); VED 405 School Shop (3); VED 406 Practicum in Building Construction (3); VED 407 Practicum in Electricity (3); VED 408 Practicum in General Shop (3); VED 409 Teaching Electronics (3); VED 442 Practicum in Metalworking Processes (3); VED 444 Practicum in Environmental Systems (3); VED 457 Practicum in Graphic Arts (3); CA 345 Creative Crafts (3); Select 21 hrs. from: VED 200 Typewriting (3); VED 450 Special Topics (1-5); VED 495 Practicum (1-15); VED 508 Teaching Mechanical Technology (5); VED 552 Instructional Programs in Construction Industry (4); VED 554 Instructional Programs in Manufacturing Industry (4); CA 113 Housing for Man (3); CA 215 Survey of the Decorative Arts (3); CA 385 Creative Weaving (3); EM 370 Microcomputer Concepts and Applications in Education (4).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MUSIC, INSTRUMENTAL N-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).
Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); MU 351, 352 Music History (6).
Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).
Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).
Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).
Curriculum and Teaching and Media: 15 Hrs. EM 200 Educational Media (2); CTM 394 Teaching Elementary Instrumental Music (3); CTM 594 Materials & Organization of School Bands or CTM 593 Materials & Organization of School Orchestras (3); MU(T) or CTM Electives* (7).
Reading: 5 Hrs. CTR 570 Reading in the Content Areas of the Elementary School or CTR 571 Reading in the Content Areas of the Secondary School (5).
Area of Specialization: 94 Hrs. Applied Music (Principal) (11); Applied Music (Secondary) (6); Approved* Ensembles (11); MU 361, 362, 363 Conducting (6); Approved* Class Instruments (8); MU 131, 132, 133 Materials & Organization of Music (15); MU 231, 232, 233 Materials & Organization of Music (15); MU 477 or 537 Arranging or Orchestration (3); MU 351, 352, 353 Music History (9); Approved MU, MU(T), or CTM Electives (10).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MUSIC, VOCAL/CHORAL, N-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Hum. Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).
Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); MU 351, 352 Music History (6).
Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).
Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).
Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).
Curriculum and Teaching and Media: 15 Hrs. EM 200 Educational Media (2); CTM 595 Materials & Organization of School Choirs (3); MU 411(T) Choral Techniques (3); MU(T) or CTM Electives* (7).
Reading: 5 Hrs. CTR 570 Reading in the Content Areas of the Elementary School or CTR 571 Reading in the Content Areas of the Secondary School (5).
Area of Specialization: 94 Hrs. Applied Music (Principal) (11); Applied Music (Secondary) (6); Approved* Ensembles (11); MU 361, 362, 363 Conducting (6); MU 131, 132, 133 Materials & Organization of Music (15); MU 231, 232, 233 Materials & Organization of Music (15); MU 478 Arranging (3); MU 351, 352, 353 Music History (9); CTM 304 Music and Related Arts (5); MU 553 Choral Literature (3); Approved MU, MU(T), or CTM Electives (10).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MUSIC, GENERAL N-8

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); Fine Arts Elective from AT, MU, TH (1-3); Humanities Electives* from AT, EH, FL, MU, PA, RL, SC, TH (5-7).
Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); MU 351, 352 Music History (6).
Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (4-5); Physical Science from PHS, PS, CH, GL, AM, AY (4-5); Mathematics (4-5); Mathematics and/or Science Elective (5-8).
Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (May be from Area of Specialization) (26).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Educational Media (2); CTM 396 Early Childhood/Elementary Music Program (3); CTM 597 Materials & Organization of General Music (4); MU(T) or CTM Electives* (7).

Reading: 5 Hrs. CTR 570 Reading in the Content Areas of the Elementary School or CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 90 Hrs. Applied Music (Principal) (11); Applied Music (Secondary) (6); Approved* Ensembles (11); MU 361, 362, 363 Conducting (6); MU 131, 132, 133 Materials & Organization of Music (15); MU 231, 232, 233 Materials & Organization of Music (15); MU 477 or 478 or 537 Arranging or Orchestration (3); MU 351, 352, 353 Music History (9); CTM 304 Music and Related Arts (5); Approved MU, MU(T), or CTM Electives (9).

*See Departmental Adviser for Approval of Electives prior to enrolling.

EARLY CHILDHOOD FOR HANDICAPPED, N-3

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (3); SC 202 Speech Comm. (3); CTM 304 Music and Related Arts or AT 301 Art for Teachers (5).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives* in Social Science (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); Physical Science from AM, AY, CH, GL, PHS, PS (5); Mathematics Elective* (5); Mathematics/Natural Science/Physical Science (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Adviser-approved electives (26).

Curriculum and Teaching and Media: 16 Hrs. EM 200 Ed. Media (2); RSE 300 Handicapped Child, N-4 (5); RSE 588 Educational Approaches with Handicapped Infants & Toddlers (4); RSE 420 Organizing Instruction for Special Education (5).

Reading: 10 Hrs. CTR 370 and CTR 371 Fundamentals of Reading I, II (10).

Area of Specialization: 60 Hrs. RSE 104 Intr. Lab. Experiences (1); HCP 211 Motor Development (3); RSE 377 Introduction to Mental Retardation (5); RSE 378 Intr. to Behavior Disorders (5); FCD 267 Human Development I (4); FCD 300 Approaches to Child Study (4); RSE 529 Intr. to Learning Disabilities (5); RSE 421 Educational Diagnosis and Assessment (5); RSE 587 Ed. for Parents of Handicapped Children (4); CTC 450 Special Topics: Child's Construction of Numbers or EM 510 Media for Children (3-4); AT 301 or MU 304 Art for Teachers or Music and Related Arts (5); RSE 495 S Pract. (6); RSE 550 Lang. Dev. Handicapped (5); RSE 479 S Methods and Materials (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

EMOTIONALLY CONFLICTED, N-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); EH 260 or EH 261 or EH 262 World Literature (3); Literature Electives* (5); AT 171 or AT 172 or AT 173 History of World Art (3).

Social Sciences: 20 Hrs. EC 200 Economics (5); PG 211 Psychology (5); HY 101, 102, 103, World History or HY 121, 122, 123 Tech. & Civ. (9); PG 315 Quantitative Methods or Approved Social Science (1).

Natural and Physical Sciences and Mathematics: 20 Hrs. BI 105 Perspectives in Biology (5); BI 106 Human Biology or BI 107 Environmental Biology or ZY 250 Anatomy or ZY 251 Physiology (5); PHS 100 Introduction to Physical Science or Approved Elective* in Physical Science (5); Approved* Mathematics (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Required: EH 304 Technical Writing or EH 315 Business and Professional Writing (3); SY 201 Intr. to Sociology (5); Approved Electives* (18).

Curriculum and Teaching and Media: 17 Hrs. EM 200 Educational Media (2); RSE 300 Curriculum N-4 (5); RSE 301 Curriculum 5-12 (5); CTR 370 or CTR 371 Fundamentals of Reading Instruction I or II (5).

Reading: 5 Hrs. CTR 570 Reading in Content Areas of Elementary School or CTR 571 Reading in Content Areas of Secondary School (5).

Area of Specialization: 65 Hrs. RSE 104 Introduction to Lab. Experiences (1); RSE 420 Organization of Instruction in Special Education (5); RSE 421 Educational Diagnosis & Assessment (5); RSE 450 Special Topics (5); RSE 446 Directed Independent Study (4-6); RSE 586 Teaching Severely/Profoundly Handicapped or RSE 537 Occupational Orientation for Developmentally Disabled (5); RSE 378 Introduction to Behavior Disorders (5); RSE 479 Methods & Materials in Special Education (5); RSE 495 Practicum: Emotional Conflict (5-7); RSE 415 Teaching & Behavior Change in Rehabilitation or RSE 556 Learning Resources in Emotional Conflict (3-5); PG 435 Abnormal Psychology or PG 536 Psychology of Abnormal Children and Adolescents (4-5); Select two courses from: RSE 377 Introduction to Mental Retardation; RSE 529 Learning Disabilities; RSE 550 Language Development for Young Handicapped Children; CD 350 Introduction to Communication Disorders; RSE 587 Parent Education for Handicapped Children (8-10).

*See Departmental Adviser for Approval of Electives prior to enrolling.

MENTALLY RETARDED, N-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (1-3); Fine Arts Elective* from AT, MU, TH (1-3); Humanities Electives* (5-9).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives in Social Science* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); Physical Science from AM, AY, CH, GL, PHS, PS (5); Math Elective* (5); Mathematics, Natural Science or Physical Science Elective* (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (26).

Curriculum and Teaching and Media: 17 Hrs. EM 200 Educational Media (2); RSE 300 Curriculum N-4 (5); RSE 301 Curriculum 5-12 (5); CTR 370 Fundamentals of Reading Instruction (5).

Reading: 5 Hrs. CTR 570 Reading in the Content Areas of the Elementary School or CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 60 Hrs. RSE 104 Orientation to Lab Experiences (1); RSE 420 Organizing Instruction in Special Education (5); RSE 421 Educational Diagnosis & Assessment in Special Education (5); RSE 450 Special Topics (5); RSE 446 Directed Independent Study (4); RSE 586 Severely Multiple Handicapped (3); RSE 495P Practicum: Mild (2); RSE 585 Moderately Mentally Retarded (3); RSE 495 Practicum: Moderate (2); RSE 377 Introduction to Mental Retardation (5); RSE 479P Methods and Materials in Teaching Retarded (5); RSE 495 Practicum: Severe (2); HHP 517 Physical Education for Mentally Retarded or HHP 416 Adaptive Physical Education (3); RSE 537 Occupational Orientation for the Developmentally Disabled (5); Select two from: RSE 550 Language Development of the Young Handicapped Child; RSE 378 Introduction to Behavior Disturbance, RSE 529 Learning Disabilities; CD 350 Introduction to Speech Pathology or CD 450 Principles of Speech-Language Pathology; CD 552 Language Disorders; RSE 587 Parent Education for Handicapped Children (10).

*See Departmental Adviser for Approval of Electives prior to enrolling.

SPEECH PATHOLOGY, N-12

Common Requirements (40). See above.

Humanities and Fine Arts: 20 Hrs. EH 101, 102, 103 English Composition or EH 105, 106 Honors English (9); Literature Elective* (1-3); Fine Arts Elective* from AT, MU, TH (1-3); Humanities Electives* (5-9).

Social Sciences: 20 Hrs. EC 200 Economics (5); HY 101, 102, 103 World History or HY 121, 122, 123 Technology & Civilization (9); Approved Electives in Social Science* (6).

Natural and Physical Sciences and Mathematics: 20 Hrs. Natural Science from BI, BY, ZY, VM (5); Physical Science from AM, AY, CH, GL, PHS, PS (5); Math Elective* (5); Mathematics, Natural Science or Physical Science Elective* (5).

Health and Physical Ed.: 4 Hrs. HHP 195 Health Science (2); PE Electives (2).

Electives: 26 Hrs. Approved Electives* (26).

Curriculum and Teaching and Media: 17 Hrs. EM 200 Educational Media (2); RSE 420N Organization of Instruction in Speech Pathology (5); RSE 421N Educational Diagnosis and Assessment in Speech Pathology (5); RSE 479N Methods & Materials in Speech Pathology (5).

Reading: 5 Hrs. Select one: CTR 370 Fundamentals of Reading Instruction I; CTR 371 Fundamentals of Reading Instruction II; CTR 570 Reading in the Content Areas of the Elementary School; CTR 571 Reading in the Content Areas of the Secondary School (5).

Area of Specialization: 62 Hrs. RSE 104N Orientation to Lab. Experiences (1); CD 340 The Speech and Hearing Mechanism (5); CD 341 Phonetics (3); CD 350 Introduction to Speech Pathology (5); CD 455 Introduction to Clinical Procedures in Speech Pathology (4); CD 456 Clinical Practicum in Speech-Language Pathology (2); CD 551 Articulation Disorders (5); CD 552 Normal & Deviant Language Acquisition in Children (5); CD 553 Fluency Disorders (5); CD 554 Vocal Disorders (5); CD 560 Introduction to Audiology (5); CD 561 Hearing Pathology (5); CD 562 Hearing Evaluation, Rehabilitation, & Conservation (5); RSE 495N Practicum: Speech-Language Pathology (2); RSE 421 N Educational Diagnosis and Assessment Speech Pathology (5).

*See Departmental Adviser for Approval of Electives prior to enrolling.

Field Experiences

The Laboratory Experiences Program provides sequential learning opportunities in public school and community settings for all students throughout the teacher preparation program. Laboratory experiences are provided primarily through the following programs: (1) **Field Experience Program**, (2) **Extended Laboratory Experiences** including a para-professional level program for secondary majors, (3) **Cooperative Education Program**, and (4) **the Professional Internship**.

The pre-teaching **Field Experience Program** provides an initial experience for all students as a prerequisite for admission to the Professional Teacher Education Program. Students are required to participate in the program in conjunction with Career Exploration and Planning, or in Orientation for Transfer Students. This experience involves the students in planning and evaluating learning experiences, counselling, participating in pre-school conferences and faculty study, school and community meetings, and involvement in actual teaching situations.

The Extended Laboratory Experiences Program is conducted concurrently with enrollment in professional education courses which provide experiences in the schools and communities.

The Co-operative Education Program provides laboratory experiences for certain students involved in the teacher preparation program on an alternating quarter arrangement with college attendance.

The Professional Internship is a full-time assignment in an off-campus school and community. Experiences include personal and professional contacts with various phases

of community life and the application of concepts, skills and knowledge the students have acquired in classroom situations.

The students enroll for 15 credit hours and devote a full quarter to the internship. No additional coursework, correspondence or regular, is permitted during the internship quarter. The program is divided into orientation, off-campus experience, and evaluation. Students must be admitted to the Teacher Education Program prior to the Professional Internship and must have completed appropriate courses in their areas of specialization.

The Internship for students in N-12 Programs requires experience in both elementary and secondary schools.

Other laboratory experiences for students are provided within the framework of courses in the Teacher Education Program.

Dual Objectives Program

Students in other schools of the University who wish to complete requirements for graduation in an academic department and also to complete the degree requirements of the Teacher Education Program may pursue the dual objectives program.

Students electing to pursue the dual objectives program will have an adviser in the academic department in which they are enrolled and an adviser in the College of Education. Advising students concerning the curriculum of the academic department, including the major and other requirements, will be the responsibility of the adviser in that department. The responsibility for advising students on matters concerning the Teacher Education Program will be that of the adviser in the College of Education. The quarterly course schedule of the students will be approved by both advisers. Information describing the dual objectives program is available in the Teacher Education Services Office of the College of Education in Haley Center and in the Office of the Dean where the students are enrolled.

Students enrolled in the College of Education who desire to complete certification requirements in more than one teaching field will complete the curriculum in each field: general studies, teaching specialization and professional teacher education (including the internship).

Applications and specific information about the criteria for selection and admission to Teacher Education are available in the Teacher Education Services Office in Haley Center 3464.

Program Options, Non-Teaching

The following programs offered through the College of Education are education-related options which prepare students for service careers which do not require teacher certification.

Adult Education

Humanities and Social Sciences: 31 Hrs. EH 101, 102, 103 English Composition (9); SC 140 Speech Communication (3); HY 101 or 121, 102 or 122, 103 or 123 World History or Technology and Civilization or EH 260, 261, 262 World Literature (9)*; EC 200 or AEC 202 Economics (5); EC 202 Economics (5) or SY 201 Sociology (5) or Humanities and Fine Arts Elective (5)*.

Natural and Physical Sciences and Mathematics: 15 Hrs. Mathematics Elective from MH (5); Natural and Physical Science Electives from BI, CH, GL, PHS, PS (10)*.

*Electives: 10-21 Hrs.

Adult Education Composite: 46 Hrs. VED 102 F Orientation to Adult Ed. (1); EM 200 Ed. Media (2); FED 300 Ed. Psychology or PG 211 Psychology (5); FED 400 Measurement & Evaluation or RSY 541 Extension Program & Methods (5); VED 415 F Teaching Adult Ed. (5); VED 466 Teaching Out-of-School Groups (3); VED 513 Nature of Adult Ed. (5); CCP 521 Guidance & Counseling (4); VED 104 F Orientation Internship (1); VED 425 F Internship Adult Ed. (15).

Area of Specialization*: 85-100 Hrs. Technical Agriculture Education (100) or Training and Conference Education Courses (100) or Distributive Education Courses** (100) or Home Economics Education Courses (100) or Technical or Health Occupations Education Courses (100).

**Not more than 25 percent of the required hours for graduation may be taken in courses offered by the College of Business.

*See departmental adviser for specific requirements.

Health Promotion. A non-teaching program designed to prepare students to become health and fitness specialists for a variety of settings such as hospitals, corporate fitness centers, wellness centers, private/commercial health complexes, etc. This program does not require admission to Teacher Education. However, a related internship (HHP 425) is an integral part of the professional preparation.

General Education (90 Quarter Hours)

A. Humanities and Fine Arts (20 hours)	
EH 101 English Composition	3
EH 102 English Composition	3
EH 103 English Composition	3
Literature Electives	9
AT or Dance, MU Fine Arts	2

B. Social Sciences (24 hours)

HY 101, 102, 103 World History or	
HY 121, 122, 123 Tech. & Civil.	9
EC 200 Economics	5
PG 211 Psychology	5
SY 201 Intr. to Sociology	5

C. Natural & Physical Sciences & Mathematics (25 Hours)

BI 101 Principles of Biology or	
BI 105 Perspectives in Biology	5
ZY 250 Anatomy	5
ZY 251 Physiology	5
Approved Mathematics	5
Physical Science from AM, AY, CH,	
GL, PS, PHS, VM	5

D. Health and Physical Education (4 Hours)

HHP 195 Health Science	2
PE 101 Physical Fitness & Self App.	2

E. Others (17 Hours)

SC 140 Applied Speech Comm.	3
NF 200 Nutrition & Health	3
Electives	11

Major Area (75 Hours)**A. Foundations (7 Hours)**

HHP 102 Orientation	3
HHP 280 Foundations of Health Education	3
HHP 282 Introduction to Leisure Services	3

B. Skills & Techniques (10 Hours)

Five courses from:

PE 114 Fitness Related Topics	2
PE 116 Weight Control	2
PE 117 Aerobic Dance	2
PE 130 Jogging for Fitness	2
PE 135 Weight Training I	2
PE 152 Swimming for Fitness	2
PE 235 Weight Training II	2

C. Health Science (12 Hours)

HHP 392 Consumer Health	3
HHP 396 Drug Use & Abuse	3
HHP 404 Athletic Injuries	3
HHP 494 Emergency Care & First Aid	3

D. Exercise Science (16 Hours)

HHP 315 Kinesiology	4
HHP 405 Physiology of Exercise	4
HHP 429 Motor Learning & Performance	4
HHP 505 Principles of Adult Fitness	4

E. Planning & Evaluation (9 Hours)

HHP 296 Community Health	3
HHP 426 Evaluation and Measurement in P.E.	3
HHP 475 Health Promotion in the Workplace	3

F. Curriculum & Planning (8 Hours)

HHP 386 Leadership in Leisure Services	3
HHP 400 Programming in Leisure Services	5

G. Laboratory Experiences (3 Hours)

HHP 495 Practicum	3
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H. Electives in Major (10 Hours)**Internship (15 Hours)**

HHP 425 Professional Internship	15
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Professional Education/Supporting Courses (30 Hours)

Choose from:

Foundation Courses (17 quarter hours)

NF 318 Nutritional Biochemistry	5
NF 372 Fundamentals of Nutrition	4
NF 562 Nutrition & Physical Performance	3
NF 578 Modern Views of Nutrition	3
ZY 360 Physiological Aspects of Aging	3
PG 213 Psychology of Adjustment	5
PG 302 Psychological Aspects of Death & Dying	3
PG 431 Social Psychology	5
PG 507 Maturity & Aging	5
MN 310 Principles of Management	4
MN 346 Organizational Behavior	4
SY 370 Methods of Social Research	5
SY 477 Sociology of Aging	3
SY 577 Seminar in Medical Sociology	5
RSY 362 Community Organization	5
PSC 563 Public Health	5
HA 360 Introduction to Health Administration	5
HA 370 Health Administration & Community	5
FCD 270 Family II: Structure & Function of the Family	4
FCD 477 Human Development V: Family & Aging	3
FCD 497 Directed Field Experience	var.
CCP 223 Human Relations Training for the Health Professions	2
CCP 521 Counseling & Human Services	4
FED 300 Educational Psychology	5
FED 370 Introduction to Statistical Analysis in the Human Sciences	3
EM 370 Microcomputer Concepts and Applications in Education	4

Exercise Science. A non-teaching program designed to prepare students for research and graduate studies related to exercise sciences. This program does not require admission to Teacher Education. A senior paper (HHP 446) is required for graduation.

General Education (90 Hours)**A. Humanities and Fine Arts (20 Hours)**

EH	101	English Composition	3
EH	102	English Composition	3
EH	103	English Composition	3
		Literature Electives	9
		AT or Dance, MU Fine Arts	2

B. Social Sciences (24 Hours)

HY	101, 102, 103	World History or	
HY	121, 122, 123	Tech. & Civil	9
EC	200	Economics	5
PG	211	Psychology	5
SY	201	Introduction to Sociology	5

C. Natural & Physical Sciences & Mathematics (25 Hours)

BI	101	Principles of Biology or	
BI	105	Perspectives in Biology	5
ZY	250	Anatomy	5
ZY	251	Physiology	5
		Approved Mathematics	5
		Physical Science from AM, AY, CH, GL, PS, PHS, VM	5

D. Health and Physical Education (4 Hours)

HHP	195	Health Science	2
PE	101	Physical Fitness & Self-Appraisal	2

E. Others (17 Hours)

SC	140	Applied Speech Comm.	3
NF	200	Nutrition & Health	3
		Electives	11

Major Area (75 Hours)**A. Foundations (7 Hours)**

HHP	102	Orientation	1
HHP	280	Foundations of Health Education	3
HHP	282	Introduction to Leisure Services	3

B. Skills & Techniques (10 Hours)

		Select two PE Skill Related courses	4
		Select two PE Fitness Related courses	4

C. Health Science (6 Hours)

HHP	396	Drug Use and Abuse	3
HHP	404	Athletic Injuries or	
HHP	494	Emergency Care and First Aid	3

D. Exercise Science (23 Hours)

HHP	211	Motor Development	3
HHP	315	Kinesiology	4
HHP	335	Sports Psychology	4
HHP	405	Physiology of Exercise	4
HHP	429	Motor Learning and Performance	4
HHP	505	Principles of Adult Fitness	4

E. Planning & Evaluation (3 Hours)

HHP	426	Evaluation and Measurement in Physical Education	3
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F. Curriculum & Planning (3 Hours)

HHP	416	Adaptive Physical Education	3
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G. Laboratory Experiences (9 Hours)

HHP	495	Practical	9
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H. Electives in Major (14 Hours)

Approved Electives

Internship

HHP	446	Senior Paper	5
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**Professional Education/
Supporting Courses (40 Hours)**

EM	200	Educational Media	2
EM	370	Microcomputer Concepts and Applications in Education	4
PG	212	Developmental Psychology	5
PS	200	Foundations of Physics	5

Select 4-5 Hours from:

BI	106	Human Biology	5
CH	101	Introductory Chemistry	2
CH	102	Introductory Chemistry or	2
CH	103	Fundamentals of Chemistry	4

Approved electives from one of the following categories:
(19-20 Hours)

Biological Sciences
Psychosocial Sciences
Mathematics & Physical Sciences

TOTAL—210 QUARTER HOURS

Recreation and Sports Management. A non-teaching program designed to prepare students to become recreation, park, and sports complex managers and/or administrators. This program does not require admission to Teacher Education. However, a related internship (HHP 425) is an integral part of the professional preparation.

General Education (90 Hours)**A. Humanities and Fine Arts (20 Hours)**

EH	101	English Composition	3
EH	102	English Composition	3
EH	103	English Composition	3
		Literature Electives	9
		AT or Dance, MU Fine Arts	2

B. Social Sciences (24 Hours)

HY	101, 102, 103	World History or	
HY	121, 122, 123	Tech. & Civil	9
EC	200	Economics	5
PG	211	Psychology	5
SY	201	Introduction to Sociology	5

C. Natural & Physical Sciences & Mathematics (25 Hours)

BI	101	Principles of Biology or	
BI	105	Perspectives in Biology	5
ZY	250	Anatomy	5
ZY	251	Physiology	5
		Approved Mathematics	5
		Physical Science from AM, AY, CH, GL, PS, PHS, VM	5

D. Health and Physical Education (4 Hours)

HHP	195	Health Science	2
PE	101	Physical Fitness & Self-Appraisal	2

E. Others (17 Hours)

SC	140	Applied Speech Comm.	3
NF	200	Nutrition & Health	3
		Electives	11

Major Area (75 Hours)**A. Foundations (4 Hours)**

HHP	102	Orientation	1
HHP	282	Introduction to Leisure Services	3

B. Skills and Techniques (10 Hours)

HHP	351	Water Safety	3
		or	
HHP	121	Skills and Concepts of Aquatics	2
HHP	485	Social Recreation	3
		Electives	5-6

C. Health Science (6 Hours)

HHP	396	Drug Use and Abuse	3
HHP	494	Emergency Care and First Aid or	
HHP	404	Athletic Injuries	3

D. Exercise Science (3-4 Hours)

Select one from:

HHP 211 Motor Development	3
HHP 315 Kinesiology	4
HHP 335 Sports Psychology	4

or

HHP 405 Physiology of Exercise	4
HHP 429 Motor Learning and Performance	4
HHP 505 Principles of Adult Fitness	4

E. Planning and Evaluation (6 Hours)

Select two from:

HHP 296 Community Health	3
HHP 426 Evaluation and Measurement in Physical Education	3
HHP 475 Health Promotion in the Workplace or HHP 486 Park Planning	3

F. Curriculum and Planning (17 Hours)

HHP 384 Park and Recreation Maintenance	3
HHP 386 Leadership in Leisure Services	3
HHP 388 Camp Management	3
HHP 400 Programming in Leisure Services	5
HHP 424 Organization of Intramural Sports Programs	3

G. Laboratory Experiences (3 Hours)

HHP 450 Special Topics	3
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H. Electives in Major (25-26 Hours)

Select Option Area One or Two:

Option One: Recreation and Park Administration

HHP 387 Outdoor Recreation	3
HHP 389 Recreation Interpretive Services	3
HHP 487 Park Management	3
HHP 495 Outdoor Recreation Practicum	3

or

HHP 446 Independent Study	3-5
Electives	15-17

Option Two: Sports Management

HHP 201 History and Principles of Physical Education	3
Skill and Technique Electives	10-13
Exercise Science Electives	10-13

Internship (15 Hours)

HHP 425 Professional Internship	15
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Professional Education/Supporting Courses (30 Hours)

MN 310 Principles of Management	4
or	
PO 325 Introduction to Public Administration	5
MN 442 Personnel Management	4
or	
PO 515 Public Personnel Administration	3
MT 241 Business Law I	4
MT 255 Legal and Social Environment of Business or MT 344 Environmental Law	4
SC 204 Introduction to Public Relations or SC 111 Public Speaking	5
EM 200 Educational Media	2
EM 370 Microcomputer Concepts and Applications in Education	4
or	
AEC 210 Microcomputer Applications in Agriculture	3
NF 101 Intro. to Hospitality Management	3
Approved Electives	0-5

TOTAL—210 QUARTER HOURS

Rehabilitation Services Education. This non-teaching program does not require completion of the Professional Education Core.

GENERAL EDUCATION**63 Hours Total****English**

EH 101-102-103 English Composition (3-3-3)	9
EH Literature (American-English-World)	9
SC 140 Applied Speech Communication	3

Social Science

HY 101-102-103 World History (3-3-3) or HY 121-122-123 Tech. and Civilization (3-3-3)	9
PG 211 Intr. to Psychology	5

Natural Sciences

BI 101 Principles of Biology	5
Approved Physical Sciences	10

Mathematics

MH 140-College Algebra or MH 160 -Pre-Calculus with Trigonometry	5
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Physical Education

PE Approved Physical Education	3
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Elective

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HUMAN SERVICES FOUNDATIONS**99 Hour Total****Educational**

IED 101 — or RSE 102R Career Explor. & Planning	1
EM 200 — Educational Media	2
FED 300 — Educational Psychology	5
CCP 322 — Human Relations in Education	2
FED 400R — Evaluation in Education	5

Psychological

PG 433 — Personality	4
PG 435 — Behavior Pathology or FED 534 Personality Dynamics and Effective Behavior	4(5)

Psychology Elective	5
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Sociological

SY 201 — Intr. Sociology	5
Sociology Elective or FED 350 (Sociological Option)	5
CCP 524 — Community Resources Rehabilitation	3

Biological/Medical

ZY 250 — Human Anatomy	5
ZY 251 — Physiology	5
CCP 523 — Medical and Adjustment Aspects of Rehab.	4

Vocational

EC 206 — Socio-Economic Foundation of Cont. America	3
RSE 535 — Intro. Vocational Evaluation	5
RSE 537 — Occ. Orientation of Develop. Disabled	5
RSE 538 — Work Adjustment in Rehabilitation	5

Exceptionality

RSE 330 — Careers in Rehabilitation	5
RSE 376 — Exceptionality	5
RSE 414 — Assessment Methods in Rehabilitation	3
RSE 415 — Teaching and Behavior Change Strategies in Rehabilitation	3
RSE 495R — Practicum in Rehabilitation	5
CCP 522 — Intro. Counseling the Exceptional	4

REHABILITATION SPECIALTY LEVEL

RSE 446R — Independent Study-Rehabilitation	3
RSE 495R — Practicum in Rehabilitation	5
RSE 425R — Internship in Rehabilitation	15
Approved Program in Area of Specialty	25

Total **210 Hours**

Graduate Programs

Graduate programs are offered through the Graduate School in administration and supervision; counselor education; educational media; elementary education; health education; physical education; rehabilitation services; secondary education; special education; and vocational and adult education.

Fifth and sixth-year programs of study in the above areas lead to the degrees of Master of Science, Master of Education, and Specialist in Education. Nondegree graduate study is also available through the Diploma Program leading to sixth-year certification.

The Doctor of Education is offered in Educational Leadership, Counselor Education, Elementary Education, Health Education, Physical Education, Secondary Education, and Vocational and Adult Education. Specializations in Secondary Education include the following sub-specializations: (a) English Education, (b) Mathematics Education, (c) Science Education, and (d) Social Science Education. See *Graduate School Bulletin*.

The Master of Education, Master of Science in Education, Specialist in Education and Doctor of Education are offered for junior college administrators, student personnel administrators, and teachers. These programs meet requirements of the Southern Association of Colleges and Schools, the Graduate School, and the College of Education. Sufficient flexibility exists to permit students to adapt programs to their individual needs.

Related Programs and Services

Teacher Certification Services

Programs in the College of Education are approved by the National Council for Accreditation of Teacher Education (NCATE), the National Association of State Directors of Teacher Education and Certification (NASDTEC), the Interstate Reciprocity Compact (IRC) and the Alabama State Board of Education for certifying superintendents, supervisors, principals, counselors, elementary and secondary teachers, and educational media specialists. Upon satisfactory completion of a prescribed course of study and upon recommendation of the Dean of the College of Education a professional certificate will be issued by the appropriate State Department of Education. Twenty-eight State Departments of Education now have reciprocal agreements for issuing certificates to graduates of institutions accredited by NCATE.

Students in schools other than the College of Education who wish to complete requirements for graduation in an academic department and also to complete the degree requirements of the Teacher Education Program may pursue the dual objectives program. Students may also take courses in education and psychology for acquiring knowledge and

understanding of human growth and development, and teaching as a profession. They are eligible to take all such courses for which they satisfy prerequisites.

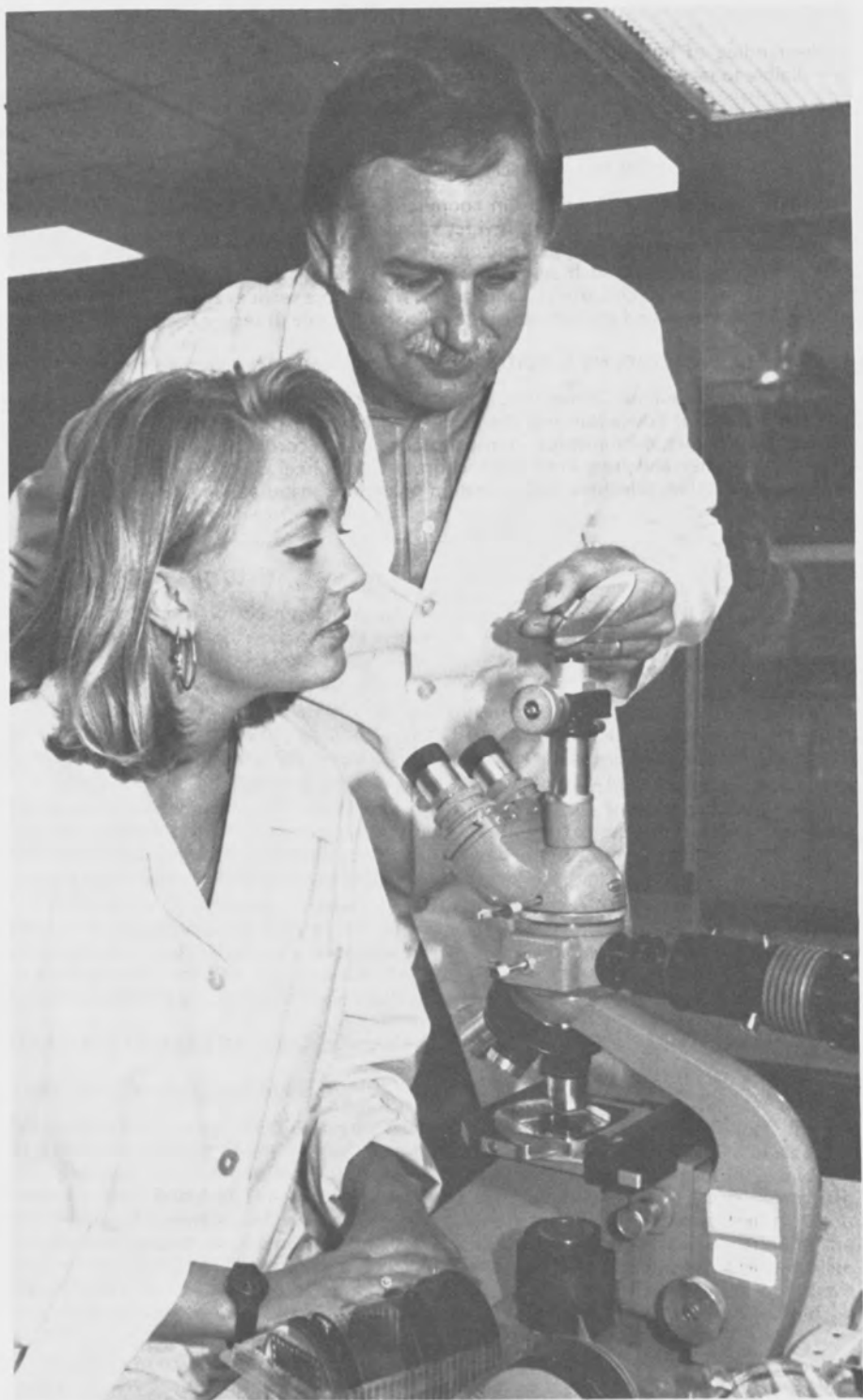
Vocational Rehabilitation Service

HOWARD, HUDSON, AND PATTERSON, *Counselors*

The State Department of Education in cooperation with Auburn University maintains the local Rehabilitation Service which provides vocational guidance, counseling, training, and placement services to handicapped citizens. The Rehabilitation Service also makes available to handicapped citizens such services as: surgical and/or medical care, hospitalization, therapeutic treatment, and artificial appliances, when these services are essential to training and/or employment and the individual is not financially able to secure them.

Learning Resources Center

The Learning Resources Center (LRC), located in Haley Center, is a service component for the College of Education and the College of Liberal Arts. The LRC provides media services which include filmstrips, transparencies, disc recordings, tape recordings, kits, educational games, and programs of instruction. LRC personnel assist the faculty and students with the production, selection, and utilization of learning materials.



College of Engineering

WILLIAM F. WALKER, *Dean*

M. DAYNE ALDRIDGE, *Associate Dean*

EDWARD O. JONES, *Associate Dean*

JOSEPH S. BOLAND III, *Associate Dean*

ENGINEERS in the 1990s will be faced with world-wide problems and expectations awesome in responsibility yet exciting as professional challenges. These range from the extremes of interplanetary exploration through earth orbiting systems to the problems arising mainly from our population explosion: energy, better productivity, housing, transportation, and pollution control.

As a renewed appreciation develops for the contribution of science and technology, engineering leaders are calling for engineers better equipped to tackle the specific, technical problems of the future. Significantly, they also are calling for engineers who by breadth of education and understanding of other disciplines can convince others of the role of engineers not only in technical matters but in policy decisions to insure the use of technology to benefit mankind. We hope, therefore, we are entering an era in which science and technology will receive a more objective assessment.

Engineering education at Auburn provides in a four-year curriculum both the technical knowledge and the broad general education necessary to equip engineers for their problem-solving challenges. Centered around mathematics and the physical sciences, the curricula also stress the importance of social sciences, humanities, and communication skills. Auburn's engineering programs enable individuals to develop their natural talents and to provide knowledge, skills, and understanding that will encourage them to find their places in society as well as in their vocations.

Admission

Freshmen eligibility is determined by the Admissions Office. However, since the requirements for engineering education necessitate high school preparatory work of high intellectual quality and of considerable breadth, the following program is recommended as *minimum* preparation: English, four units; mathematics (including algebra, geometry, trigonometry, and analytical geometry), four units; chemistry, one unit; history, literature, social science, two or three units. Physics and foreign languages are recommended but not required.

Transfers from Other Institutions must apply through the Admissions Office. The exact placement of these students can be determined only upon review of their transcripts by the College of Engineering.

The College of Engineering allows credit for courses completed with satisfactory grades (**C** or better) provided the courses *correspond in time and content* to courses offered at Auburn. Courses that are taught at the 300-level or higher at Auburn are generally not transferable from junior colleges.

Many courses required by the College of Engineering are highly specialized in their content and potential transfer students need to select courses with care. Therefore, to insure maximum transferability of credits, students are encouraged to contact the College as soon as possible about acceptable credits.

Transfers from On-Campus must be approved by the College of Engineering and the admissions committee of the chosen curriculum, and meet the same academic requirements as off-campus transfer students.

Academic residency requirements — The College of Engineering's continuation in residency policy for those students who have completed their pre-engineering requirements and are classified in their engineering curricula is as follows:

1. Engineering students will be placed on engineering academic warning whenever their quarterly grade point average is less than a 2.0.
2. If — during the next quarter in residence — a student on engineering academic warning does not earn a 2.0 quarterly grade point average, that student will be placed on engineering academic probation.
3. If — during the next quarter in residence — a student on engineering academic probation does not earn a 2.0 **cumulative GPA** — that student will be automatically withdrawn from

the College of Engineering with the notation, "Dropped from College of Engineering" placed on their record.

4. Students who are dropped under the above provisions are eligible for consideration for admission to other curricula outside the College of Engineering, provided they meet the general scholastic requirements for continuance in the university. The student should check with the registrar to determine his or her academic status.

Degree Requirements — To earn the bachelor's degree in the College of Engineering students must complete all the subjects in their curriculum, have a minimum grade point average of 2.0 in all work attempted at Auburn University and have a cumulative grade point average of 2.0 on all courses passed in the major at Auburn. The major is defined as all course work with the departmental prefix in the student's curriculum . . . that is, for an electrical engineering student, all courses with the EE prefix are considered to be in the major. It is the responsibility of the student to keep informed of course requirements and scheduling. Failure to do so may jeopardize graduation.

Class Attendance — Due to the demand for engineering courses, it is the students' responsibility to attend classes for which they are registered. Failure to do so may result in the loss of the student's eligibility for a seat in class.

Programs

Undergraduate

Pre-Engineering — The Pre-Engineering Program consists of a freshman program of studies to prepare students for curricula in the College of Engineering. It also provides academic and career counseling to assist students in determining the curriculum that best fulfills their personal and educational objectives.

Professional Programs — Curricula accredited by the national accrediting agency, the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET, formerly the Engineers' Council for Professional Development), lead to the degrees of Bachelor of Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, Materials Engineering, Mechanical Engineering, Bachelor of Science in Agricultural Engineering, and Bachelor of Textile Management and Technology. The curriculum leading to the Bachelor of Computer Science is accredited by the Computer Science Association Commission of the Computing Sciences Accreditation Board.

These curricula are designed to meet the educational requirements of the engineering professions. The program in the fundamental sciences of mathematics, chemistry, and physics is followed by a study of basic engineering sciences. Specialized or departmental courses are taken in the third and fourth years with humanistic-social studies interspersed throughout the four years. Flexibility is provided in all degree programs through electives so that the individual may emphasize areas of personal interest.

Others — The Bachelor of Aviation Management degree (administered by the Aerospace Engineering Department) provides education for management careers with the airlines, general aviation, airports, and other industries.

The Textile Engineering Department administers curricula leading to the degrees of Bachelor of Textile Engineering and Bachelor of Textile Chemistry. These programs are designed to prepare one for a career in one of the many facets of the textile industry.

The Bachelor of Science in Forest Engineering is offered jointly by the Agricultural Engineering Department and the School of Forestry. The curriculum combines professional courses in engineering and forestry for students who want careers in forest industries that require training in both engineering and forestry.

Dual-Degree — The College of Engineering has agreements with several predominantly liberal arts institutions to offer an academic program where a student can earn two baccalaureate degrees. Under the terms of this program the first three years of study are devoted to earning a major in any one of the disciplines offered by the institution first entered, while completing the basic sciences and mathematics courses required for pre-engineering at Auburn.

Upon completion of three years of study in the liberal arts the student transfers to the College of Engineering. After a minimum of two years of study in an engineering curriculum, the student earns degrees from both institutions. The broad background provided by this program may enable a student to cope more effectively with many of the problems of modern-day society.

Dual degree agreements have also been made with Auburn University's Colleges of Agriculture, Liberal Arts, and Sciences and Mathematics, to provide for dual degree programs with the College of Engineering.

Graduate — Master of Science degrees are offered in Aerospace Engineering, Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. In addition, there are two professional degrees, Master of Industrial Engineering and Master of Mechanical Engineering. The Doctor of Philosophy degree is offered in Aerospace Engineering, Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. For requirements for these degrees, see the *Graduate School Bulletin*.

Humanistic-Social Studies Requirements

In addition to being specialists in their own fields, engineers must also be acquainted with the humanities, be aware of the social implications of their activities, and be equipped to assume responsibilities in these areas. To assist them in this preparation, degree requirements include approximately 20 quarter-credit hours of humanistic-social studies in addition to the specified courses in English Composition and History. The courses are either prescribed, elective, or a combination, depending upon the specific engineering curriculum.

The electives must be selected with care since all students must eventually complete *at least one humanities and one social science course*. It cannot be overemphasized that the selection should include some advanced-level courses rather than unrelated, beginning courses. The following humanities and social science courses meet the requirements of the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology:

HUMANITIES

Art: 370-379; **English:** Any course in literature; **Foreign Language:** All courses; **History:** All courses of 200-level or higher; **Music:** 251, 252, 253, 311, 312, 351, 352, 353, 372, 373, 374; **Philosophy:** All courses; **Religion:** All courses; **Speech Communication:** 230, 235, 320, 433, 436; **Theatre:** 302, 361, 362, 371, 372, 373, 374, 441, 471, 472; **University Courses:** 270, 271, 272, and Honors Lyceum.

SOCIAL SCIENCES

Agricultural Economics and Rural Sociology: AEC 200, 202, 505, 509, 512, 530; RSY 261, 362, 561, 562, 565. **Anthropology:** All courses; **Economics:** 200, 202, 206, 301, 340, 350, 360, 433; **Engineering:** EGR 420; **Family and Child Development:** 267, 269, 270; **Geography:** 215, 302, 303, 304, 305, 306, 307, 308; **Pharmacy:** 265; **Political Science:** All courses; **Psychology:** All courses; **Sociology:** 201, 202, 204, 301, 304, 409, 411, 477, 478; **Speech Communication:** 250, 340, 410, 431, 441, 450, 480, 481; **University Courses:** 275, 305.

Cooperative Education — The Cooperative Education Program is offered in all curricula of the College of Engineering. Refer to the program and write to the Director, Cooperative Education, Auburn University, AL 36849, for a booklet which gives additional information.

Extension — The Engineering Extension Service helps to extend the resources of the College of Engineering to the people, businesses, and industries of the state. Most of the programs of this expanding service are short courses, conferences, workshops, and seminars. For further information, write to the Director, Engineering Extension Service, 107 Ramsay Hall, Auburn University, AL 36849.

Videotape-Based Off-Campus Courses — The College of Engineering offers graduate-level courses for credit and non-credit to off-campus students through its Office of Continuing Engineering Education. Graduate-level courses are videotaped in the classroom on the Auburn campus and mailed to off-campus students on the same day. Students enrolled in the program are required to do the same homework assignments and take the same exams as the on-campus students enrolled in the course. For information on admission to the program, fees, course offerings and other particulars, write to the Associate Dean of Engineering for Off-Campus Instruction, Office of Continuing Engineering Education, 107 Ramsay Hall, Auburn University, AL 36849 or call (205) 826-4370.

Pre-Engineering

Scholastic Requirements — Pre-Engineering students are transferred to the curriculum of their choice in the College of Engineering upon meeting the following requirements:

1. Complete all appropriate freshman courses;
2. Earn an overall grade point average on all required and approved elective course work as follows: 2.6 for Electrical Engineering; 2.0 for Textile Management and Technology; 2.2 for all other curricula.
3. Be recommended by the Curriculum Admissions Committee.

A student who has not met the above criteria after six resident quarters is dropped from the College of Engineering. Junior standing will not be granted to any student in the Pre-Engineering Program.

Military Science — All curricula in the College of Engineering permit the use of some basic and advanced ROTC courses passed at Auburn University. For these options, see the specific curriculum. Twelve ROTC course credits are approved for all engineering curricula by the College of Engineering only for those ROTC students who are enrolled in, and complete a 12-quarter AU ROTC program. For those students who do not complete a 12-quarter AU ROTC program, course credit will be determined on an individual basis. **ROTC courses cannot be substituted for any ABET required courses.**

The Pre-Engineering curriculum shown below is uniform for Aerospace, Civil, Computer Engineering and Computer Science, Electrical, Industrial, Materials, and Mechanical Engineering. Chemical and Textile Engineering have separate freshman year requirements.

Pre-Engineering Curriculum (PN)

FRESHMAN YEAR											
First Quarter				Second Quarter				Third Quarter			
MH	161	An. Geom. & Cal.*	5	MH	162	An. Geom. & Cal.	5	MH	163	An. Geom. & Cal.	5
CH	103	Fund. Chem. I.**	4	CH	104	Fund. Chem. II.	4	PS	220	Gen. Physics I.	3
CH	103L	Gen. Chem. Lab.	1	CH	104L	Gen. Chem. Lab.	1	PS	220L	Gen. Physics Lab. I.	1
EH	101	English Comp.	3	EH	102	English Comp.	3	EH	103	English Comp.	3
HY		History†	3	HY		History†	3	HY		History†	3
				IE	102	Graph. Comm. & Des.	3			Hum.-Soc. Elective	3

*Students not prepared for Mathematics 161 are enrolled in Mathematics 160.

**Students not eligible for CH 103 are enrolled in CH 101 (2) and IE 102 (3) followed by CH 102 (2) and CH 103L (1) then CH 104 and 104L.

†Credit in History meets ABET Humanities requirement. Recommended sequence HY 121, 122, 123

Basic ROTC may be substituted for three hours of Humanistic-Social Electives.

Department of Aerospace Engineering

The Aerospace Engineering curriculum provides a background for students entering many areas of today's scientific and technological fields. The first two years of study are devoted to the basic subjects of mathematics and physical sciences. The last two years deal with such areas as aerodynamics, design, astrodynamics, propulsion, structures, and flight dynamics. In support of these areas, courses in advanced mathematics, computer programming (both digital and analog), and systems analysis are offered. The methods of systematic problem analysis are stressed. The theory taught in classroom lectures is experimentally verified in laboratory sessions. During the senior year students may take technical electives in several fields of specialization. The Aerospace Engineering Curriculum also serves as a background for graduate study and research.

Curriculum in Aerospace Engineering (AE)

FRESHMAN YEAR

(See Pre-Engineering Curriculum)

SOPHOMORE YEAR

First Quarter		Second Quarter		Third Quarter	
MH	264 An. Geom. & Cal. ....5	ME	321 Dynamics I .....4	EE	302 Intr. to Elect. Engr. I .....3
ME	205 Applied Mechanics Statics .....4	PS	222 General Physics III .....3	ME	301 Thermodynamics I .....4
PS	221 Gen. Physics II .....3	PS	222 Gen. Physics Lab. III .....1	AE	300 Aerospace Analysis I .....3
PS	221 Gen. Physics Lab. II .....1	MH	265 Linear Diff. Equatns .....3	ME	207 Strength of Matis. I .....3
AE	203 Aerospace Fund. ....3		Hum.-Soc. Elect.* .....5		Hum.-Soc. Elect.* .....3
	Free Elective .....1		Free Elective1		

JUNIOR YEAR

AE	307 Aerosp. Structures I .....5	AE	302 Airloads .....4	AE	409 Aerosp. Structures II .....5
AE	310 Aerosp. Analysis II .....4	AE	303 Theor. Aerodynam. I .....4	AE	304 Theor. Aerodynam. II .....4
EE	301 Engr. Instrumentn. ....3	AE	326 Fund. of Aero-space Dynamics .....3	AE	305 Flight Performance .....3
ME	340 Fluid Mechanics I .....3	AE	311 Aerosp. Materials & Methods of Construction .....2	PS	320 Modern Physics .....3
	Hum.-Soc. Elect.* .....3	EHA	304 Tech. Writing** .....3		Hum.-Soc. Elect.*3

SENIOR YEAR

AE	415 Jet Propuls. ....5	AE	400 Viscous Aerodynam. ....4	AE	529 Aircraft Vibration and Flutter .....4
AE	439 Static Stability & Control .....4	AE	432 Astrodynamics I .....3	AE	533 Astrodynamics II .....3
AE	434 Aero. Systems Anal. ....3	AE	541 Dyn. Stab. & Control. ....3	AE	449 Aero. Design III .....2
AE	447 Aerospace Design I .....2	AE	448 Aero. Design II .....2		Technical Elective .....6
	Tech. Elective** .....4		Tech. Elective .....5		Hum.-Soc. Elect.*3

TOTAL — 208 QUARTER HOURS

*See section on Humanistic-Social Electives.

**Advanced ROTC may be substituted for EHA 304 and 3 hours of Technical Electives.

†Basic ROTC may be substituted for 1 hour of free elective and 2 hours of Hum.-Soc. electives.

SUGGESTED TECHNICAL ELECTIVES

In addition to the subjects listed below, other subjects may be used as technical electives upon approval of the Head of the Department.

AE	491 Special Problems .....1-5	AE	580 Engineering Law and Ethics .....3
AE	501 Adv. Three-dimensional Aerodynamics .....3-5	CHE	540 Nuclear Engineering .....5
AE	508 Intr. to Computational Fluid Dynamics .....5	EE	371 Electronics .....3
AE	514 Equilibrium Gas Dynamics .....3	IE	360 Engineering Economics Analysis .....3
AE	516 Rocket Propulsion I .....3	IE	410 Probability & Statistics .....5
AE	517 Rocket Propulsion II .....3	ME	303 Thermodynamics III .....3
AE	520 Dynamic Simulation .....3	ME	501 Statistical Thermodynamics .....3
AE	521 Flight Vehicle Stress Analysis .....3	ME	521 Heat Transfer .....4
AE	524 Nonequilibrium Gas Dynamics .....3	ME	522 Transport Phenomena .....3
AE	528 Space Propulsion Systems .....5	ME	543 Photoelastic Stress and Strain Analysis .....3
AE	535 Elements of V/STOL Flight .....3	MHC	503 Complex Variables with Applications .....5
AE	536 Rotary Wing Aerodynamics .....3	MHT	506 Elementary Partial Diff. Equations .....3
AE	542 Automatic Stability and Control .....3	MHT	563 Introduction to Numerical Analysis .....5
AE	543 Flight Simulation .....3	MHT	564 Introduction to Numerical Analysis .....5
AE	545 Missile Aerodynamics .....3		

Aviation Management

The Aviation Management curriculum provides the graduate with a technical management background with specialization in aviation leading to careers with the airlines, aircraft manufacturers and airports as well as many other segments of the aviation industry. Information regarding awards, scholarships, internships, and aviation management student organizations is available through the Program Coordinator.

ALTERNATIVE AREAS OF CONCENTRATED STUDY

While there is only one Aviation Management curriculum, there are other major fields of concentration within the basic program. These are Professional Flight Management, Airway Science Management, and Management in Aircraft System. Descriptions follow:

PROFESSIONAL FLIGHT MANAGEMENT (AMF)

Requires flight education and training through either Certified Flight Instructor rating or Multi-Engineer rating. The major develops competence in flight in preparation for a flight operation career with the airlines; a corporation flight department, a flight instructor. Special fee required for the flight training courses.

AIRWAY SCIENCE MANAGEMENT (AMA)

Follows an approved selection of professional electives prescribed by the Federal Aviation Administration for a career in air traffic control.

AIRCRAFT SYSTEMS MANAGEMENT (AMS)

Established and approved by the Federal Aviation Administration to provide for a career as a Flight Safety Inspector. Special fees required for flight training courses.

Those individuals who are interested in registering in any of the foregoing major fields are advised to contact the Program Coordinator, Aviation Management in the Department of Aerospace Engineering as soon as that decision is made so proper counseling and classification can be provided.

Curriculum in Aviation Management (AMN)

First Quarter			FRESHMAN YEAR			Third Quarter					
			Second Quarter								
MH	160	Pre-Cal.	5	MH	161	An. Cal.	5	AM	200	Aero. Prob.	5
EH	101	English	3	EH	102	English	3	EH	103	English	3
HY	204	History	3	HY	205	History	3	HY	206	History	3
GY	102	World Geog.	5	PG	211	Psychology	5	EC	200	Economics I	5
AM	101	Intr. Avn.	3	IE	102	Engr. Draw.	3				
			SOPHOMORE YEAR								
SC	111	Speech	5	AE	203	Aero. Fund.	3	AM	220	Statistics	5
AM	207	Basic Program	3	PS	206	Physics	4	MT	241	Bus. Law	4
PS	205	Physics	4	AC	211	Accounting	4	CH	103	Chemistry	5
EC	202	Economics II	5	AM	201	Elem. Aero.	5	AC	212	Accounting	4
			JUNIOR YEAR								
AM	309	Recip. Eng.	3	AM	310	Jet Probl.	3	AM	313	Veh. Systems	5
AM	305	Meteorology	5	AM	320	Econ. Anal.	5	AM	314	Opnl. Prob.	5
MN	310	Princ. Mgmt.	4	MT	372	Econ. of Transp.	5	AM	337	Air Trans.	5
FI	361	Prin. of Finance	5	EHA	304	Tech. Writing	3			Prof. Elective	3
						Prof. Elective	2				
			SENIOR YEAR								
AM	403	Gen. Avn. Mgmt.	3	AM	409	Aerosp. Law & Ins.	3	AM	401	Aero. Sem.	1
MN	346	Org. Beh.	4	AM	413	Apt. Mgmt.	3	AM	417	Airline Opns.	5
PG	561	Indus. Psy.	5			Prof. Elective	6			Prof. Elective	5
MN	443	Labor Relat.	5			Prof. Elective	5			Prof. Elective	6

TOTAL — 209 QUARTER HOURS

Twelve hours of ROTC (Basic 6; Advanced, 6) may be substituted for SC 111 (5 hours) GY 102 (5 hours) and 2 hours of professional electives.

SUGGESTED PROFESSIONAL ELECTIVES COURSES OTHER THAN THOSE LISTED BELOW MAY BE USED AS PROFESSIONAL ELECTIVES ONLY UPON APPROVAL BY THE PROGRAM COORDINATOR

AVIATION MANAGEMENT				MANAGEMENT COURSES				SPEECH COMMUNICATION			
AM	215	Prin. Pvt. Flt. I	3	EHA	415	Wrtin. Bus. Comm.	3	SC	340	Comm. in Org.	5
AM	216	Prin. Pvt. Flt. II	3		416	Appl. Writing	3				
AM	217	Pvt. Flt. Trn. I	1								
AM	218	Pvt. Flt. Trn. II	1	MN	305	Adv. Comp. Pgm.	4	CE	201	Surveying	5
AM	404	Gen. Avn. Opns.	3	MN	307	Bus. Comp. Apl.	4	CE	350	Hwy. Engr.	3
AM	405	Avn. Safety	3	MN	380	Pm. Opr. Mgmt.	4	CE	450	Traf. Engr. Fund.	3
AM	414	Aprt. Planning	3	MN	381	Mng. Dec. Mkg.	5	CE	452	Airport Dsgn.	3
AM	418	Intl. Airlines	3	MN	382	Mgt. Info. Systems	5	CE	524	Air Pollution	5
AM	419	Air Traf. Control	5	MN	385	Prod. Mng.	5	CE	556	Trans. Plann.	3
AM	420	Air Cargo Opns.	3	MN	386	Mtrls. Mng.	5				
AM	421	Comm. Airline	3	MN	415	Sml. Bus. Mng.	5	ACCOUNTING COURSES			
ECONOMICS COURSES				MN	501	Labor Law	5	AC	213	Mgr. Cost & Bud.	4
EC	360	Money & Banking	5	MN	502	Labor Negot.	4	AC	311	Inter. Acct. I	5
EC	433	Law & Econ.	5	MN	503	Labor Arbit.	3	AC	312	Inter. Acct. II	5
EC	551	Inter. Micro.	5					AC	313	Inter. Acct. III	5
EC	552	Comp. Econ. Sys.	5					AC	410	Cost Acct.	5
EC	553	Econ. of Grwth.	5	MARKETING COURSES				FINANCE COURSES			
EC	555	Indust. Organs.	5	MT	255	Leg. Env. Bus.	4	FI	320	Risk & Insurance	5
EC	556	Inter. Micro.	5	MT	331	Prin. of Mkt.	5	FI	323	Real Estate	5
EC	562	Inter. Monetary	5	MT	336	Quan. Anal. Mkt.	5	FI	362	Sm. Bus. Fin.	5
EC	565	Public Fin.	5	MT	341	Buyer Behvr.	5	FI	363	Adv. Bus. Fin.	5
EC	571	Intl. Econ.	5	MT	344	Envrn. Law	4	FI	421	Prop. Ins.	5
				MT	432	Prom. Strategy	5	GEOGRAPHY			
ENGLISH COURSES				MT	436	Mkt. Res. Meth.	5	GY	302	Econ. Geo.	5
EHA	315	Bus. & Prof. Rpt. Writ.		MT	440	Intr. Mktg.	5	GY	401	Geo. of Int. Rel.	5
				MT	344	Environ. Law	4				

Department of Agricultural Engineering

The Agricultural Engineering Department offers programs in Agricultural Engineering and in Forest Engineering.

The Agricultural Engineering curriculum provides the graduate with engineering skills necessary to serve the nation's largest industry — agriculture. In addition to a strong background in mathematics, physical sciences, and basic engineering fundamentals, the student of agricultural engineering receives training in biological and agricultural sciences. Through technical electives in the senior year, one can specialize in one or more areas to include soil and water conservation, power and machinery design, electric power and processing, agricultural structures and environment, food engineering and waste management and agricultural pollution control.

The curriculum is coordinated by the College of Engineering and the College of Agriculture. Students register in Engineering and are assigned an academic adviser in Agricultural Engineering. Beginning students should apply for admission to the College of Engineering and complete the Pre-Agricultural Engineering program. For qualified agricultural students who develop an interest in Agricultural Engineering during their freshman year, an alternate course sequence for completion of the Pre-Agricultural Engineering program under the guidance of an Agricultural Engineering adviser is available in the College of Agriculture.

Curriculum in Agricultural Engineering (AN)

First Quarter			FRESHMAN YEAR			Third Quarter		
			Second Quarter					
MH	161	An. Geom. & Cal. ....5	MH	162	An. Geom. & Cal. ....5	MH	163	An. Geom. & Cal. ....5
CH	103	Fund. Chem. I ....4	CH	104	Fund. Chem. II ....4	PS	220	General Physics I ....3
CH	103L	Gen. Chem. Lab. ....1	CH	104L	Gen. Chem. Lab. ....1	PS	220L	Gen. Physics I Lab ....3
EH	101	English Comp. ....3	EH	102	English Comp. ....3			Fortran Prog. ....3
HY	101	or 204, History ....3	HY	102	or 205, History ....3	EH	103	English Comp. ....3
IE	102	Graphic Communication & Design ....3	AN	101	Intr. to Ag. & For. Engr. or elective ....1	HY	103	or 206, History ....3
			SOPHOMORE YEAR					
AN	201	Engr. Prin. in Ag. & For. ....5	AEC	202	Ag. Economics II ....5	BI	101	Prin. of Biology ....5
MH	264	An. Geom. & Cal. ....5	EGR	207	Mech. of Solids ....3	ME	301	Thermodynamics I ....4
EGR	205	Applied Mechanics-Statics ....4	MH	265	Linear Diff. Equatns ....3	ME	321	Dynamics I ....4
PS	221	General Physics II ....3	PS	222	General Physics III ....3	MH		Math Elective ....3
PS	221L	Gen. Physics II Lab ....1	PS	222L	Gen. Physics III Lab ....1			
			JUNIOR YEAR					
AY	307	General Soils ....5	AN	311	Fund. of Mob. Eqpt. Des. ....5	AN	313	Conservtn. & Water Mgt. Engineering ....6
EE	302	Intr. to Elect. Engr. I ....3	AN	315	Ag. Processing & Food Engineering ....5	AN	317	Environm. of Ag. Structures ....3
EE	330	Analysis & Design of Logic Circuits ....4	EE	303	Intr. to Elec. Engr. II ....3	AN	316	Elec. Systems in Ag. ....5
CE	310	Hydraulics I ....3	EGR	420	Prof. Prac. in Engr. Tech. Elective ....3			Technical Elective ....3
EHA	304	Technical Writing ....3						
			SENIOR YEAR					
AN	403	App. Struc. Anal. & Design ....3	AN	430	Engr. Des. for Bio. Systems I ....4	AN	530	Engr. Des. for Bio. Systems II ....4
		Ag. Elective ....5	IE	360	Econ. Analysis Ag. Elective ....5			Hum.-Soc. Elective ....9
		Technical Elective ....3			Technical Elective ....5			Technical Elective ....4
		Hum.-Soc. Elective ....3						
AN	418	Waste Mgmt. & Util. Systems ....4						

TOTAL — 210 QUARTER HOURS

A list of recommended electives is available in the offices of the adviser and Dean. Electives must be approved by them.

Basic ROTC may be substituted for three hours of Humanistic-Social Science electives.

Advanced ROTC may be substituted for EHA 304 (3 hours) and three additional hours approved by the department head.

Forest Engineering

Forest Engineering is a multi-disciplinary science dealing with two of our most important natural resources — timber and land — and mechanical devices and processes for their efficient utilization. Forest engineers are professionally trained to apply engineering and forestry principles to solve operations problems in regenerating, growing, harvesting, handling, transporting, and processing timber. In addition, they also deal with the engineering problems related to other forest resources.

The curriculum is coordinated by the College of Engineering and the School of Forestry. Students register in the College of Engineering and are assigned academic advisers in Agricultural Engineering and in Forestry. Beginning students should apply to the College of Engineering and complete the Pre-Forest Engineering program. For qualified forestry students who develop an interest in Forest Engineering during their freshman year, an alternate course sequence for completion of the Pre-Forest Engineering program under the guidance of an Agricultural Engineering and a Forestry adviser is available in the School of Forestry.

The Forest Engineering curriculum is accredited as a professional forestry program by the Society of American Foresters and is designed also to meet accreditation requirements of the Accreditation Board for Engineering and Technology.

Curriculum in Forest Engineering (FYE)

FRESHMAN YEAR

First Quarter				Second Quarter				Third Quarter			
MH	161	An. Geom. & Cal.*	5	MH	162	An. Geom. & Cal.	5	MH	163	An. Geom. & Cal.	5
CH	103	Fund. Chem. & Lab.	5	CH	104	Fund. Chem. & Lab.	5	PS	220	Gen. Physics I	4
IE	102	Graph. Comm. & Design	3	EH	102	English Comp.	3			FORTTRAN Prog.	3
						Hum.-Soc. Elective	3	EH	103	English Comp.	3
EH	101	English Comp.	3			History or Lit.***	3			History or Lit.***	3
		History or Lit.***	3								

SOPHOMORE YEAR

MH	264	An. Geom. & Cal.	5	ME	301	Thermodynamics I	4	ME	321	Dynamics I	4
PS	221	Gen. Physics II	4	PS	222	Gen. Physics III	4	EGR	207	Mech. of Solids	3
EGR	205	App. Mech. Stat.	4	MH	265	Diff. Equations	3	BI	102	Plant Biology	5
FYE	201	Engr. Prin. in Ag. & Forestry	5	BI	101	Prin. of Biology	5	AEC	202	Ag. Economics II	5

SUMMER CAMP**

FY	307	Intr. to Forest Op. & Mgt.	3
FY	301	Dendrology I	3
FYE	304	For. Surveying	5
FY	305	Field Mensuration	4

JUNIOR YEAR

FY	315	For. Meas.	3	FY	316	Inventory Design	3	FY	423	Forest Ecology	4
IE	410	Engr. Statistics	5	FYE	311	Fund. of Mob. Equip. Des.	5	FYE	401	Forest Mach.	3
CE	310	Hydraulics I	3	CE	430	Intr. Soil Mech.	5	EE	302	Intr. Elec. Engr. I	3
		Hum.-Soc. Elective	3	EGR	420	Prof. Prac. in Engr.	1	FY	317	Growth & Yield	3
EHA	304	Tech. Writing or	3			Hum.-Soc. Elective	4	FYE	509	Hyd. Control Syst.	5
EHA	315	Bus. & Prof. Report Writing	3								

SENIOR YEAR

FY	540	Forest Econ.	4	FY	541	For. Mgt. & Admin. Engr. Elective	4	FY	543	For. Policy	2
FY	523	Silviculture	4			Hum.-Soc. Elective	5	FYE	530	Engr. Design for Biological Syst. II	4
CE	350	Transp. Engr.	3	FYE	430	Engr. Design for Biological Syst. I	4	EE	303	Intr. Elec. Engr. II	3
FYE	403	App. Struct. Anal. & Design	3					FYE	572	Engr. Design of For. Harv. Syst.	5
		Dir. Engr. Elective ††	5								

TOTAL — 225 QUARTER HOURS

*Students whose combined ACT scores for English and Mathematics are lower than 50, or whose total SAT scores are less than 1100, are enrolled in MH 160 for no credit.

**Students must be in residence at camp. BI 102 is a prerequisite for summer camp.

***Selected from one of the following sequences: HY 101-102-103; HY 121-122-123; EH 260-261-262.

†Selected from one of the following: EC 202 or AEC 202.

††Directed Engineering Elective must be selected from the following: CE 311, 360; ME 302 or ME 316 or ME 322 and ME 323.

Department of Chemical Engineering

The program leading to the bachelor's degree in chemical engineering consists largely of the study of broad scientific and engineering principles which have numerous applications in the chemical and related industries. In order to assist those students wishing to pursue special interests, options are offered in Biochemical Engineering, Computer Aided Design and Control, Energy, Environmental Chemical Engineering, Pre-Medicine, and Pulp and Paper Engineering.

The broad university education provided, when supplemented by professional experience, enables graduates to qualify as engineers in production, research and development, sales engineering, plant design, and management in the chemical industry and in a wide range of related industries — petroleum, plastics, metals, paper, pharmaceuticals, and many others. Those students who elect to continue their education through one or more advanced degrees are qualified for better positions and often make more rapid progress than those with just the bachelor's degree.

Curriculum in Chemical Engineering (CHE)

FRESHMAN YEAR		
First Quarter		Second Quarter
CH 111 General Chem. I.....5	CH 112 General Chem. I.....5	CH 113 General Chem.....5
MH 161 An. Geom. & Cal. ....5	MH 162 An. Geom. & Cal. ....5	MH 163 An. Geom. & Cal. ....5
EH 101 English Comp. ....3	EH 102 English Comp. ....3	EH 103 English Comp. ....3
HY History* .....3	HY History* .....3	HY History* .....3
CHE 101 Intr. CHE I .....1	CHE 102 Intr. CHE II .....1	
SOPHOMORE YEAR		
CHE 210 Mass Balances.....3	CHE 211 Energy Balances.....4	CHE 336 Thermo. I.....4
CHE 213 Comp. in CHE .....4	CH 207 Organic Chem. ....5	CHE 361 Fluid Mech.....4
MH 264 An. Geom. & Cal. ....5	PS 221 General Physics .....4	CH 208 Organic Chem. ....5
PS 220 General Physics .....4	MH 265 Diff. Equations.....3	PS 222 General Physics .....4
	Hum.-Soc. Elective .....3	
JUNIOR YEAR		
CHE 337 Thermo. II .....4	CHE 363 Mass Transfer .....4	CHE 370 Reaction Eng.....4
CHE 362 Heat Transfer .....4	CHE 366 Stagewise Op.....4	CHE 486 CHE Lab II.....3
CH 507 Physical Chemistry .....5	CHE 382 CHE Lab I.....3	EE 301 Engr. Instrm. ....3
EHA 304 Tech. Writing*** .....3	CH 508 Physical Chemistry .....5	Elective****.....5
Hum.-Soc. Elective .....3	EE 302 Intr. El. Eng. I .....3	Hum.-Soc. Elective .....3
SENIOR YEAR		
CHE 516 Pro. Dyn. & Cont. ....4	CHE 517 Dig. Proc. Cont. ....4	CHE 447 Comp. Proc. Des.....3
CHE 444 Proc. Des. Prac. ....2	CHE 546 Comp. Proc. Sim.....4	Elective****.....9
CHE 545 Proc. Ec. & Des. ....3	CHE 518 P. D. & C. Lab .....2	Hum.-Soc. Elective** .....5
CHE 487 CHE Lab III .....3	Elective****.....5	
CHE 470 Seminar** .....1	Hum.-Soc. Elective .....3	
Hum.-Soc. Elective .....4		

TOTAL — 210 QUARTER HOURS

*As needed to satisfy University history requirement.

**May be replaced by Basic ROTC.

***May be replaced by Advanced ROTC.

****Electives total 19 hours and must be selected as below:

One course from CH 209, 509, 510, 513, 518 or FP 478.

Two courses from CHE Electives.

Additional courses from list of approved tech. electives. Three hrs. of Elective may be replaced by Adv. ROTC.

†CH 103, 103L and 104, 104L are acceptable substitutes for CH 111 and 112 for students transferring into CHE or PCHE.

Biochemical Engineering Option

Freshman and Sophomore Years

(See Chemical Engineering Curriculum)

JUNIOR YEAR		
First Quarter		Second Quarter
CHE 337 Thermo. II .....4	CHE 363 Mass Transfer .....4	CHE 370 Reaction Eng.....4
CHE 362 Heat Transfer .....4	CHE 366 Stagewise Op.....4	CHE 486 CHE Lab II.....3
CH 507 Physical Chemistry .....5	CHE 382 CHE Lab I.....3	EE 301 Engr. Instrm. ....3
MB 300 Microbiol.....5	CH 508 Physical Chemistry .....5	CH 518 Biochem.....5
	EE 302 Intr. El. Eng. I .....3	EHA 304 Tech. Writing*** .....3
Third Quarter		

SENIOR YEAR

CHE 444 Proc. Des. Pract. ....2	CHE 517 Dig. Proc. Cont. ....4	CHE 447 Comp. Proc. Des. ....3
CHE 516 Pro. Dyn. & Cont. ....4	CHE 518 P.D. & C. Lab ....2	CHE 595 Biochem. Eng. ....3
CHE 545 Proc. Ec. & Des. ....3	CHE 546 Comp. Proc. Sim. ....4	CHE 487 CHE Lab III ....3
CHE 470 Seminar** .....1	CHE 594 Bioprocessings ....3	Hum.-Soc. Elective ....9
MB 540 Microbiol. Phys. and Genetics*** .....3	Hum.-Soc. Elective** ....5	
Hum.-Soc. Elective ....4		

TOTAL — 210 QUARTER HOURS

**May be replaced by Basic ROTC.

***May be replaced by Advanced ROTC.

Computer-Aided Design and Control Option

Freshman and Sophomore Years

(See Chemical Engineering Curriculum)

First Quarter

CHE 337 Thermo II ....4
CHE 362 Heat Transfer ....4
CHE 415 Comp. Appl. CHE ....4
EHA 304 Tech. Writing** .....3
Elective** .....3

JUNIOR YEAR

Second Quarter

CHE 363 Mass Transfer ....4
CHE 366 Stagewise Op. ....4
CHE 382 CHE Lab I .....3
CH 507 Physical Chemistry ....5
EE 302 Intr. El. Eng. I .....3

Third Quarter

CHE 370 Reaction Eng. ....4
CHE 486 CHE Lab II ....3
CH 508 Physical Chem. ....5
EE 301 Engr. Instrm. ....3
Hum.-Soc. Elective ....3

SENIOR YEAR

CHE 516 Pro. Dyn. & Cont. ....4	CHE 517 Dig. Proc. Cont. ....4
CHE 444 Proc. Des. Pract. ....2	CHE 546 Comp. Proc. Sim. ....4
CHE 545 Proc. Ec. & Des. ....3	CHE 518 P.D. & C. Lab ....2
CHE 470 Seminar* .....1	Elective*** .....5
Elective*** .....3	Hum.-Soc. Elective* ....3
Hum.-Soc. Elective ....4	

CHE 519 Adv. Top. Cont. ....4
CHE 447 Comp. Proc. Des. ....3
CHE 487 CHE Lab III ....3
Hum.-Soc. Elective* ....5
Hum.-Soc. Elective ....3

TOTAL — 210 QUARTER HOURS

*May be replaced by Basic ROTC.

**May be replaced by Advanced ROTC.

***Electives total 11 hours and must include one course from CH 305, 509, 510, 513, 518, or FP 478. Additional courses from list of approved electives.

Energy Option

Freshman and Sophomore Years

(See Chemical Engineering Curriculum)

First Quarter

CHE 337 Thermo II ....4
CHE 362 Heat Transfer ....4
CH 507 Physical Chemistry ....5
EHA 304 Tech. Writing*** .....3
Hum.-Soc. Elective ....3

JUNIOR YEAR

Second Quarter

CHE 363 Mass Transfer ....4
CHE 366 Stagewise Op. ....4
CHE 382 CHE Lab I .....3
CH 508 Phys. Chem. II ....5
EE 302 Intr. El. Engr. I .....3

Third Quarter

CHE 370 Reaction Eng. ....4
Elective**** .....3
CHE 486 CHE Lab II ....3
CH 513 Anal. Chem. ....5
EE 301 Engr. Instrm. ....3

SENIOR YEAR

CHE 515 Comp. Appl. CHE ....4	CHE 517 Dig. Proc. Cont. ....4
CHE 516 Pro. Dyn. & Cont. ....4	CHE 518 P.C. & D. Lab ....2
CHE 444 Proc. Des. Pract. ....2	CHE 546 Comp. Proc. Sim. ....4
CHE 545 Proc. Ec. & Des. ....3	Elective**** .....4
CHE 470 Seminar** .....1	Hum.-Soc. Elective ....3
Hum.-Soc. Elective ....4	

CHE 412 Surf. & Coll. Sci. ....3
CHE 447 Comp. Proc. Des. ....3
CHE 487 CHE Lab III ....3
Hum.-Soc. Elective** ....5
Hum.-Soc. Elective ....3

TOTAL — 210 QUARTER HOURS

**May be replaced by Basic ROTC.

***May be replaced by Advanced ROTC.

****Electives total seven (7) hours and may come from CH 305, 512; CHE 401, 561, 627, 640; GL 530; ME 338, 524, 550, or other electives approved by the department upon special request. Three hrs. may be replaced by Adv. ROTC.

Environmental Chemical Engineering Option

Freshman and Sophomore Years
(See Chemical Engineering Curriculum)

First Quarter

CHE	337	Thermo II	4
CHE	362	Heat Transfer	4
CH	507	Physical Chemistry	5
EHA	304	Tech. Writing***	3
		Hum.-Soc. Elective	3

JUNIOR YEAR**Second Quarter**

CHE	363	Mass Transfer	4
CHE	366	Stagewise Op.	4
CHE	382	CHE Lab I	3
CH	508	Phys. Chem. II	5
EE	302	Intr. El. Engr. I	3

Third Quarter

CHE	370	Reaction Engr.	4
CE	421	Wastewater Treat.	4
CHE	486	CHE Lab II	3
MB	300	Microbiology	5
EE	301	Engr. Instrm.	3

CHE	516	Pro. Dyn. & Cont.	4
CE	520	Env. Chem. I	3
CHE	545	Proc. Ec. & Des.	3
CHE	470	Seminar**	1
CHE	444	Proc. Des. Pract.	2
		Hum.-Soc. Elective	3

SENIOR YEAR

CHE	517	Dig. Proc. Cont.	4
CHE	518	P.D. & C. Lab	2
CHE	546	Comp. Proc. Sim.	4
CE	521	Env. Chem. II***	3
		Hum.-Soc. Elective	3

CHE	565	Haz. Mat. Mgt.	4
CHE	447	Comp. Proc. Des.	3
CHE	487	CHE Lab III	3
		Hum.-Soc. Elective**	5
		Hum.-Soc. Elective	4

TOTAL — 210 QUARTER HOURS

**May be replaced by Basic ROTC.

***May be replaced by Advanced ROTC.

Pre-Medicine Option**FRESHMAN YEAR****Second Quarter**

CH	111	General Chemistry†	5
MH	161	An. Geom. & Cal.	5
EH	101	English Comp.	3
HY	101	World History	3
CHE	101	Intr. CHE I***	1

CH	112	General Chemistry†	5
MH	162	An. Geom. & Cal.	5
EH	102	English Comp.	3
BI	101	Prin. Biol. & Lab**	5
CHE	102	Intr. CHE II***	1

Third Quarter

CH	113	General Chemistry	5
MH	163	An. Geom. & Cal.	5
EH	103	English Comp.	3
BI	103	An. Biol. & Lab	5

SOPHOMORE YEAR

CHE	210	Mass Balances	3
CHE	213	Computers in CHE	4
MH	264	An. Geom. & Cal.	5
PS	220	General Physics	4
HY	102	History	3

CHE	211	Energy Balances	4
CH	207	Organic Chemistry	5
PS	221	General Physics	4
MH	265	Diff. Equations	3
HY	103	History	3

CHE	336	Thermo I	4
CHE	361	Fluid Mech.	4
CH	208	Organic Chemistry	5
PS	222	General Physics	4

JUNIOR YEAR

CHE	337	Thermo II	4
CHE	362	Heat Transfer	4
CH	209	Organic Chem.	5
EHA	304	Tech. Writing***	3

CHE	363	Mass Transfer	4
CHE	366	Stagewise Op.	4
CHE	382	CHE Lab I	3
ZY	310	Cell Bio. & Lab	6

CHE	370	Reaction Engr.	4
CHE	486	CHE Lab II	3
EE	302	Intr. El. Engr. I	3
CH	507	Physical Chemistry	5
		Hum.-Soc. Elective*	3

SENIOR YEAR

CHE	516	Pro. Dyn. & Cont.	4
CHE	545	Proc. Econ. & Des.	3
CHE	487	CHE Lab III	3
CHE	444	Proc. Des. Pract.	2
CH	508	Physical Chemistry	5

CHE	517	Dig. Proc. Cont.	4
CHE	518	Process Cont. Lab	2
CHE	546	Computer Proc. Sim.	4
		Elective****	2
		Hum.-Soc. Elective	3

CHE	447	Computer Proc. Des.	3
CHE	595	Biochem. Engr.	3
EE	301	Engr. Instrm.	3
		Hum.-Soc. Elective*	9

TOTAL — 210 QUARTER HOURS

*PG 211 Introductory Psychology and PG 212 Developmental Psychology are preferred HS electives.

**May be replaced by Basic ROTC.

***May be replaced by Advanced ROTC.

****May be chosen from ZY 300, 301, 302, 524; CH 518, 519 or other electives approved on special request. Most students take additional electives in the summer following their sophomore or junior years. Two hours of electives may be replaced by Advanced ROTC.

†CH 103, 103L and 104, 104L are acceptable substitutes for CH 111 and 112 for students transferring into MCN.

Pulp and Paper Engineering Option

Freshman and Sophomore Years

(See Chemical Engineering Curriculum)

JUNIOR YEAR								
First Quarter		Second Quarter		Third Quarter				
CHE	337 Thermo II	4	CHE	363 Mass Transfer	4	EE	301 Engr. Instrm.	3
CHE	362 Heat Transfer	4	CHE	366 Stagewise Op.	4	CHE	370 Reaction Engr.	4
CH	507 Physical Chemistry	5	CHE	382 CHE Lab I	3	CHE	486 CHE Lab II	3
CHE	310 Pulp & Paper Tech.	3	FP	478 Wood Chem.	4	CH	508 Phys. Chemistry II	5
CHE	515 Comp. App. CHE	4	EE	302 Intr. El. Engr. I	3	EHA	304 Tech. Writing***	3
SENIOR YEAR								
CHE	516 Pro. Dyn. & Cont.	4	CHE	517 Dig. Proc. Cont.	4	CHE	512 Surf. & Coll. Sci.	3
CHE	545 Proc. Ec. & Des.	3	CHE	518 P.D. & C. Lab	2	CHE	512L Surf. & Coll. Sci. Lab	1
CHE	410 Pulp & Paper Proc. Lab***	3	CHE	556 Comp. Proc. Sim.	3	CHE	457 Comp. Proc. Des.	3
CHE	444 Proc. Des. Prac.	2	CHE	510 Pulp & Paper Engr.	3	CHE	487 CHE Lab III †	3
CHE	470 Seminar**	1		Hum.-Soc. Elective**	5		Hum.-Soc. Elective	6
	Hum.-Soc. Elective	6						

TOTAL — 210 QUARTER HOURS

**May be replaced by Basic ROTC.

***May be replaced by Advanced ROTC.

†One section devoted to pulp and paper engineering.

Department of Civil Engineering

Civil Engineers play an essential role in the realization of the most basic needs and goals of society including the need for shelter, mobility, water, air, productive land, energy supplies and recreational facilities. Civil engineering is an extremely broad field and draws from all the basic sciences. Its areas of activities range from the design of structural systems to construction of the same, from earth physics to microbiology, from traffic flow analysis to the disposal of hazardous waste. The scope and complexity of the field, and its degree of involvement with other fields, has increased rapidly with the development of modern science and technology and with the growth of population and national economies.

Likewise the challenges and opportunities to serve mankind significantly have dramatically increased since Civil Engineers serve and interact with the public more than any other engineering discipline. Opportunities for continuing high technology planning and design in both the public and private sectors as well as movement into top management positions are excellent in civil engineering.

Since new problems are continually presenting special challenges to the civil engineer, the civil engineering curriculum at Auburn University emphasizes the applications of basic scientific principles and mathematics for the solution of engineering problems. The first two years of work are primarily concerned with the scientific and mathematical principals that form the basis of engineering practice.

The last two years include the applications of these principles, along with opportunities for elective courses in areas of individual interest. All students receive instruction in construction management, soil mechanics, transportation, hydraulics, structural analysis and design and environmental engineering. Computer applications are integrated throughout the required and elective offerings.

Curriculum in Civil Engineering (CE)**FRESHMAN YEAR**

(See Pre-Engineering Curriculum)

SOPHOMORE YEAR

First Quarter		Second Quarter		Third Quarter	
EC 200 Economics I	5	MH 265 Diff. Equations	3	ME 301 Thermodynamics I	4
MH 264 An. Geom. & Cal.	5	PS 222 Physics III	3	ME 321 Dynamics	4
PS 221 Physics II	3	PS 222L Physics III Lab	1	EGR 207 Mech. of Solids	3
PS 221L Physics II Lab	1	CE 201 Surveying	5	CE 301 CE Analysis	3
CE 202 Intro. to Comp.	5	EGR 205 Statics	4	Hum.-Soc. Elective†	3
		CE 200 CE Seminar	1		

EE 302 Circuits.....3	CE 311 Hydraulics.....3	CE 350 Highway Engr. I.....3
CE 310 Hydraulics.....3	CE 321 Water & Wastewater.....3	CE 420 Water Treat.....4
CE 360 Structures I.....5	CE 362 Structures II.....3	CE 430 Intr. to Soils.....5
IE 360 Engr. Econ.....3	CE 303 Statistics.....4	CE 465 Steel I.....3
EHA 304 Tech. Writing††.....3	GL 315 Geology.....4	Hum.-Soc. Elective.....3
	CE 311L Hydraulics Lab.....1	

JUNIOR YEAR

CE 421 Wastewater Trt.....4	SC 140 App. Sp. Comm.††.....3	CE 440 Con. & Spec.....3
CE 431 Soil & Found.....3	Transp. Elect.....3	Design Elect.....3
CE 460 Concrete I.....3	Design Elect.....3	Tech. Elect.....6
CE 312 Hydrology.....3	Tech. Elect.....3	Hum.-Soc. Elective*.....3
CE 482 CE Materials.....4	Hum.-Soc. Elective*.....4	

TOTAL — 207 QUARTER HOURS

*See section on Humanistic-Social Electives.

†Three hours of basic ROTC may be substituted. See section on Humanistic-Social Electives.

††Three hours of Advanced ROTC may be substituted.

TECHNICAL AND DESIGN ELECTIVES

A list of suggested technical and design electives may be obtained in the departmental office. Any section not on the list must be approved by the head of the department.

Department of Computer Science and Engineering

Computer Science — The Computer Science curriculum, leading to the degree Bachelor of Science in Computer Science, is intended to assure an adequate foundation in science, mathematics, the humanities, the social sciences, and computer science fundamentals, as well as an appropriate *higher* computer science specialization. The curriculum integrates technical computer science requirements with institutional requirements and electives to prepare the student for a professional career and for further study in computer science. This program has been accredited by the Computer Science Accreditation Commission (CSAC) of the Computing Sciences Accreditation Board, Inc., and the curriculum is designed to meet general Auburn University requirements.

Curriculum in Computer Science (CS)

FRESHMAN YEAR

(See Pre-Engineering Curriculum)

SOPHOMORE YEAR

First Quarter		Second Quarter		Third Quarter	
FL	Foreign Language*.....5	FL	Foreign Language*.....5	FL	Foreign Language*.....5
MH	264 An. Geom. & Cal.....5	MH	265 Linear Diff. Equatns.....3	EE	330 Analysis & Design of Logic Circuits.....4
PS	221 General Physics II.....3	PS	222 General Physics III.....3	CSE	340 Data Structures.....3
PS	221L Gen. Physics Lab II.....1	PS	222L Gen. Physics Lab III.....1	MH	266 Linear Algebra.....3
CSE	200 Fund. of Struc. Prog.....4	CSE	220 Struc. Prog. II.....5		Minor.....3

JUNIOR YEAR

MH	371 Discrete Math for Computer Science.....3	PO	209 Intr. Amer. Govt., or	CSE	422 Intr. Sftwr. Engr.....3
EE	335 Microcomp. Org. & Assmby. Lang. Prog.....4	PO	210 St. & Local Govt.....5	CSE	400 Syst. Prog.....3
SY	201 Intr. Sociology.....5	EE	430 Comprtr. Syst. Design.....4	CSE	400L Syst. Prog. Lab.....1
CSE	360 Fund. Algorithms.....3	CSE	350 Largesc. Comp. Org. & Assm. Lan.....3	IE	311 Prob. for Engrs.....3
	Minor.....3		Literature**.....3		Literature**.....3
			Minor.....3		Minor.....4

SENIOR YEAR

CSE	405 Operating Sys.....3	CSE	530 Comprtr. Arch. & Design.....4	CSE	521 Compiler Const.....3
CSE	520 Theory of Formal Languages.....3	CSE	412 Database Syst. I.....3	CSE	521L Comp. Constr. Lab.....1
CSE	560 Artificial Intel.....4	CSE	440 Fund. Comp. Graph.....4		Minor.....3
	Literature**.....3		Minor.....6		CSE Elective.....3
	Minor.....3			MH	Math Elective†.....5

TOTAL — 207 QUARTER HOURS

*One year of the same language.

**EH 253-254-255, or 260-261-262, or 250-251.

†Selected from an approved list obtained from the CSE undergraduate counselor.

ROTC Substitutions

Freshman Year: Three basic courses for three hours Hum.-Soc. Elective.

Sophomore Year: Three basic courses for three hours Literature.

Junior Year: Three advanced courses for one hour minor and two hours foreign language.

Senior Year: Three advanced courses for three hours foreign language.

Minor — Concentration outside of Computer Science; minimum of 25 hours in one general area of concentration. Individual programs, developed by the student and the CSE adviser, are approved by the CSE adviser and the heads of the departments offering the courses. Suggested, but not limited to, areas of concentration are Business, Mathematics, Science, Engineering, and select areas of Agriculture.

Computer Engineering — The Computer Engineering curriculum, leading to the degree Bachelor of Computer Engineering, is a design-oriented curriculum intended to prepare students for careers in logic design, systems programming, and integration of computer systems, as well as for graduate work. The curriculum is designed to meet general Auburn University requirements and is accredited by the Accreditation Board for Engineering and Technology (ABET).

Curriculum in Computer Engineering (CPE)

FRESHMAN YEAR

(See Pre-Engineering Curriculum)

First Quarter

EC	200	Economics I	.....5
MH	264	An. Geom. & Cal.	.....5
PS	221	General Physics II	.....3
PS	221L	Gen. Physics Lab II	.....1
CSE	200	Fund. of Struct. Prog.	.....4

SOPHOMORE YEAR

Second Quarter

ME	205	Applied Mechanics - Statics	.....4
PS	222	General Physics III	.....3
PS	222L	Gen. Physics Lab III	.....1
CSE	220	Struct. Prog. II	.....5
EE	261	Linear Circuit Anal. I	.....3
MH	265	Linear Diff. Equatns.	.....3

Third Quarter

EE	263	Circuit Analysis II	.....4
EE	264	Circuit Anal. II Lab	.....1
EE	330	Analysis & Design of Logic Circuits	.....4
CSE	340	Data Structures	.....3
MH	266	Linear Algebra	.....3
		Hum.-Soc. Elective	.....3

JUNIOR YEAR

MH	371	Discrete Math for Computer Science	.....3
EE	335	Microcomp. Org. & Assembly Lang. Prog	.....4
EE	371	Electronics I	.....3
PS	320	Modern Physics	.....3
CSE	360	Fund. Algorithms	.....3

EE	430	Comptr. Syst. Design	.....4
ME	301	Thermodynamics I or 321 Dynamics I	.....4
CSE	350	Largesc. Comp. Org. & Assembly Lang. Prog.	.....3
IE	311	Prob. for Engrs.	.....3
		Hum.-Soc. Elective	.....3

CSE	422	Intr. Sftwr. Engr.	.....3
EE	362	Linear Systems or 411 Operatns. Research	.....5
CSE	400	Syst. Prog.	.....3
CSE	400L	Syst. Prog. Lab	.....1
EHA	304	Tech. Writing	.....3
IE	360	Engr. Econ. Analysis	.....3

SENIOR YEAR

CSE	530	Comptr. Arch. & Design	.....4
CSE	405	Operating Sys.	.....3
CSE	560	Artificial Intel.	.....4
CSE		Elective†	.....3
		Hum.-Soc. Elective	.....3

CSE	520	Theory of Formal Languages	.....3
CSE	412	Database Systems I	.....3
CSE	440	Fund. Comp. Graph.	.....4
CSE	571	Des. Project	.....3
CSE		Elective†	.....3

CSE	521	Compiler Constr.	.....3
CSE	521L	Comp. Constr. Lab	.....1
CSE	572	Des. Project	.....2
CSE		Elective†	.....3
		Hum.-Soc. Elective	.....3
		Technical Elective†	.....3

TOTAL — 207 QUARTER HOURS

†Selected from an approved list obtained from the CSE undergraduate counselor.

ROTC Substitutions

Freshman Year: Three basic courses for three hours Hum.-Soc. Elective.

Sophomore Year: Three basic courses for three hours technical elective.

Junior Year: Three advanced courses for three hours EHA 304.

Senior Year: Three advanced courses for two hours Hum.-Soc. Elective, one hour CSE Elective.

Department of Electrical Engineering

The Electrical Engineering curriculum is a carefully formulated program designed to prepare its graduates for the practice of engineering at a professional level in an era of rapid and challenging technological development. It is accredited by the Accreditation Board for Engineering and Technology (ABET).

Fundamental to the program is a broad liberal education base of humanistic — social studies which are intended to impart a sense of social awareness and responsibility, tempered by humanistic values. An extensive program of study in basic sciences and mathematics provides the physical understanding and analytical tools which are requisite for the study of engineering.

The professional portion of the curriculum draws heavily from other engineering disciplines to provide a broad engineering science base in such fundamental engineering subjects as mechanics, thermodynamics, strength of materials and engineering economy. The curriculum major — electrical engineering — emphasizes seven basic areas of study. These are: circuit analysis, communications, controls, digital systems, electronics, electromagnetics, and power systems. Technical electives in the senior year provide flexibility in the curriculum to accommodate a diversity of interests and talents. A student, through choice of technical electives, can pursue deeper study in a particular subject area or choose a variety of courses to maintain a broad program. Electives must be selected from an approved list which is provided by the student's counselor.

The curriculum places strong emphasis on the importance of hands-on laboratory experience, knowledgeable use of digital computer systems, oral and written communication skills, and the development of an ability to maintain professional competence through continued self-study after graduation.

Curriculum in Electrical Engineering (EE)

FRESHMAN YEAR

(See Pre-Engineering Curriculum)

SOPHOMORE YEAR

Second Quarter

First Quarter			Third Quarter		
MH	264	An. Geom. & Cal. 5	MH	266	Linear Algebra 3
PS	221	Gen. Physics II 3	PS	320	Mod. Physics for Engr. 3
PS	221L	Gen. Physics Lab. II 1	EE	263	Linear Circuit An. II 4
EE	201	Intr. to Comp. Prog. 3	EE	264	Lin. Cir. An. II Lab. 1
EGR	205	Appl. Mech.-Statics 3	EE	391	Electromag. Prin. I 3
		Hum.-Soc. Elective* 3	IE	311	Probability for Engrs. 3

JUNIOR YEAR

EGR	207	Strength of Mtl's. I 3	EE	340	Communications I 3
EE	335	Comp. Org. and Assy. Lang. Prog. 4	EE	374	Electronics II 4
EE	362	Linear Systems 5	EE	430	Comp. Sys. Design 4
EE	371	Electronics I 3	EE	492	Appl. Electromag. 4
EE	392	Electromag. Prin. II 3			Hum.-Soc. Elective* 3

SENIOR YEAR

IE	360	Engr. Econ. Analysis 3	EHA	304	Tech. Writing 3
EE	352	Discr. & Nonl. Sys. 4	ME	301	Thermodynamics I 4
EE	481	Energy Conversion 5	EE	489	Energy Conv. Lab. 2
		Tech. Elective* 5	EE	401	Sr. Design Projects 3
			PA	202	Ethics & Society 5

TOTAL — 210 QUARTER HOURS

Basic ROTC may be substituted for ME 207. Advanced ROTC may be substituted for IE 360 and three hours of technical electives.

*Humanistic-Social Electives and Technical Electives must be selected from approved lists which may be obtained from the electrical engineering undergraduate counselor.

Department of Industrial Engineering

Industrial Engineering differs from other branches of the engineering profession in three basic ways. First, it covers all types of industrial, commercial, and service activity. Second, it gives substantial emphasis to the role of people as well as machines and materials in systems design. Third, it becomes heavily involved in the economic and financial aspects of the problems it considers. While the Industrial Engineer is still concerned with the integration of manufacturing and production systems, many non-manufacturing industrial organizations have recognized the value of Industrial Engineering techniques. Thus, Industrial Engineers are practicing in health, marketing, financial, governmental, military, transportation, educational, agricultural, and consulting organizations as well as manufacturing firms.

The curriculum emphasizes the systems approach to the design, analysis, and control of manufacturing and production systems. Graduates are prepared to resolve problems concerning materials, people, products, services, and information. The curriculum includes

courses in manufacturing processes, computer systems and programming, production systems, industrial ergonomics, economic analysis, statistical analysis, operations research, and the design of work methods. The curriculum is flexible so as to enable the development of individual professional interests through the availability of the equivalent of approximately one and one-half quarters course work of elective hours.

Many varying employment opportunities are available to the graduate since Industrial Engineering competencies are required by almost all manufacturing and service organizations. Additionally, Industrial Engineering training and experience provides excellent training for many management positions.

Curriculum in Industrial Engineering (IE)

FRESHMAN YEAR

(See Pre-Engineering Curriculum)

SOPHOMORE YEAR

Second Quarter

First Quarter			Third Quarter		
MH	264	An. Geom. & Cal. ....5	IE	311	Prob. for Engrs.*** ....3
IE	250	Comptr. Prog. ....3	EGR	205	App. Mech.-Statics ....4
PG	211	Psychology ....5	PS	222	Gen. Physics III. ....3
PS	221	Gen. Physics II ....3	PS	222L	Gen. Physics Lab III ....1
PS	221L	Gen. Physics Lab II ....1	MH	265	Lin. Diff. Equa. ....3
					ROTC or Elective ....3

JUNIOR YEAR

AC	215	Cost Accounting ....4	IE	346	Ergonomics I. ....4
IE	333	Engr. Statistics II ....3	IE	347	Ergonomics I Lab ....1
IE	333L	Engr. Stat. II Lab. ....1	IE	352	Det. O.R. Models ....3
IE	342	Linear Programming ....3	IE	360	Engr. Econ. Anal.*** ....3
IE	390	Seminar in IE. ....1	IE	380	Manuf. Engr. I ....4
MTL	220	Matls. & Properties I ....3			Hum.-Soc. Elective* ....3
EGR	207	Strength of Mat. ....3			

SENIOR YEAR

EE	302	Intr. to Elec. Engr. I ....3	EE	303	Intr. to Elec. Engr. II ....3
IE	416	Simulation ....3	IE	425	Prod. Cont. Func. II ....3
IE	422	Prod. Cont. Func. I ....4	IE	427	Sr. Design Proj. I ....3
IE	433	Stat. Qual. Contl. ....3	EHA	304	Tech. Writing* ....3
		Hum.-Soc. Elective ....5			Tech. Elective ....5
			IE	428	Sr. Design Proj. II ....3
			ME	301	Thermodynamics I. ....4
			IE	460	Inter. Engr. ....3
					Econ. An. ....3
					Tech. Elective ....6

TOTAL — 209 QUARTER HOURS

*Six hours of Advanced ROTC may be substituted for three hours of technical electives and EHA 304, within the conditions for military science credits as explained under Pre-Engineering.

**PS 305 or 570 may be substituted. See departmental policy for details.

***A very demanding attendance policy exists for the first day in these courses.

†At least one course in the available 5 hours of Hum.-Soc. electives in the undergraduate program must be humanities.

TECHNICAL ELECTIVES

The Industrial Engineering curriculum includes 14 hours of technical electives. The electives may come from a variety of areas including, but not limited to, manufacturing engineering, occupational ergonomics, safety engineering, computer science, operations research and statistics, production systems, engineering management, and engineering methods. Example courses in several areas are listed below. A pamphlet describing elective options is available in the I.E. department office. The student is encouraged to develop an elective sequence in one or two areas and must obtain faculty adviser approval of the courses chosen. An undergraduate student wishing to take a 600-level technical elective must meet the conditions imposed by the Graduate School.

Manufacturing Engineering/Productions Systems

IE	302	Advanced Engineering Graphics ....3	IE	625	Scheduling: Theory and Applications ....3
IE	408	Problems in Machining ....5	IE	656	Intermediate Simulation ....3
IE	480	Manufacturing Engineering III: Tool Design ....3	IE	660	Materials Handling Systems ....3
IE	543	Inventory Control ....3	IE	661	Advanced Facilities Design ....3
IE	558	Reliability Engineering ....3	IE	685	Manufacturing Engineering: Metrology ....3
IE	559	Operational Control System Design ....3	ME	316	Mechanics of Materials II ....4
IE	575	Project Management ....3	ME	537	Manufacturing Processes and Materials ....3
IE	584	Manufacturing Engineering IV: Robotics ....3	MTL	320	Materials & Properties II ....4
IE	588	Manufacturing Engineering II Gages and Measurements ....5	MTL	436	Engineering Materials Science — Ferrous Metallurgy3

Occupational Ergonomics/Safety Engineering

IE	501	Safety Engineering I	3	IE	606	Occupational Safety Prog. Des. & Eval.	3
IE	502	Syst. Analysis for Safety	3	IE	609	Analysis of Physiological Work Stress	3
IE	503	Occupational Safety & Ergonomics for Prod. Engrs. and Managers	5	IE	610	Anal. & Prev. of Environ. Work Stress	3
IE	604	Safety Engineering II	3	IE	611	Occupational Biomechanics	3
IE	605	Fund. of Industrial Hygiene	3	IE	613	Design of Non-Strenuous Tasks	3
				PG	561	Industrial Psychology	5

Engineering Methods

AE	300	Aerospace Analysis I	3	EE	330	Analysis and Design of Logic Circuits	4
AE	302	Airloads	4	ME	302	Thermodynamics II	3
CE	360	Theory of Structures I	4	ME	322	Dynamics II	4
CE	362	Theory of Structures II	3	MTL	320	Materials & Properties II	4

Engineering Management

AC	410	Cost Accounting	5	MN	442	Personnel Management	4
EC	560	Introduction to Econometrics	5	MT	331	Principles of Marketing	5
IE	543	Inventory Control	3	MT	434	Purchasing	5
IE	625	Scheduling: Theory and Applications	3	PG	561	Industrial Psychology	5
				PG	562	Industrial Personnel	3

Computer Science

CSE	200	Fundamentals of Structured Programming	4	CSE	412	Database Systems I	3
CSE	220	Structural Programming II	4	CSE	512	Database Systems II	3
CSE	300	Structured Programming for Engineers and Scientists	3	CSE	520	Theory of Formal Languages I	3
CSE	301	COBOL Programming for Information Systems	3	CSE	523	Advanced Programming in ADA	3
CSE	340	Data Structures	3	EE	330	Analysis and Design of Logic Circuits	4
CSE	350	Largescale Comp. Org. & Assem. Language Programming	3	EE	335	Computer Organization and Assembly Language Programming	4
CSE	360	Fundamental Algorithm Design and Analysis	3	EE	430	Computer System Design	4
				EE	521	Machine Intelligence and Robotics I	4
				MH	371	Discrete Mathematics for Computer Sciences	3
				MHC	533	or MHT 564 Numerical Matrix Analysis I	5

Operations Research and Statistics

IE	515	Sensitivity Analysis in Operations Research Modeling	3	IE	553	Dynamic Programming	3
IE	540	Sampling and Survey Techniques	3	IE	558	Reliability Engineering	3
IE	543	Inventory Control	3	IE	625	Scheduling Theory and Applications	3
IE	550	Search Methods for Optimization	3	IE	642	Advanced Linear Programming	3
				IE	656	Intermediate Simulation	3

Department of Mechanical Engineering

The basic engineering science fields of mechanics, materials science, thermodynamics, fluid mechanics, and heat and mass transfer are covered in depth in this curriculum to give students understanding and the ability to solve problems in these areas. In addition, courses offered include instruction in combustion engines, gas turbines, power plants, air conditioning, refrigeration, automatic controls, turbomachinery and machine design. Courses in electrical subjects equip the graduate with needed fundamental knowledge in this field. Computer programming is learned through some special courses and engineering applications and computer experience integrated throughout the curriculum. Practice at developing written and verbal skills is also provided.

Modern courses at the senior level, employing both group and individual projects and computer-aided design, provide an opportunity for the student to solve typical engineering problems requiring the development of skill and cooperation in creative design, analysis, and synthesis. Technical electives are provided in the senior year to enable students to specialize to a limited extent.

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The four-year curriculum leads to the degree of Bachelor of Mechanical Engineering. This degree leads to careers in industry and government and also serves as a background for graduate study and research.

Curriculum in Mechanical Engineering (ME)

FRESHMAN YEAR

(See Pre-Engineering Curriculum)

SOPHOMORE YEAR

First Quarter			Second Quarter			Third Quarter		
MH	264	An. Geom. & Cal. ....5	PS	222	General Physics III.....3	ME	301	Thermodynamics I.....4
EGR	205	Applied Mechanics- Statics.....4	PS	222L	Gen. Physics Lab. III.....1	ME	321	Dynamics I.....4
PS	221	General Physics II.....3	MTL	210	Struct. of Materials.....3	EE	302	Intr. to EE I.....3
PS	221L	Gen. Physics Lab. II.....1	ME	206	Mech. of Mats. I.....3	MH	362	Engr. Math. I.....3
ME	208	Engr. & Compr. Meth. ....3	MH	265	Linear Diff. Equations...3	ME	309	Mech. of Mats. Lab.....2
		Basic ROTC or Elect.....1	ME	209	Compr. Lab.....2			Basic ROTC or Elect.....1
					Basic ROTC or Elect.....1			

JUNIOR YEAR

EE	303	Intr. to EE II**.....3	ME	323	Dynamics of Mchs.....4	MTL	320	Mats. & Prop. II.....4
ME	322	Dynamics II.....4	ME	302	Thermodynamics II.....3	ME	341	Fluid Mechanics II.....4
ME	316	Mech. of Mats. II.....4	MTL	220	Mats. & Prop. I.....3	ME	303	Thermodynamics III.....3
EHA	304	Technical Writing.....3	ME	340	Fluid Mechanics I.....3	PS	320	Modern Phys. for Engr. ....3
		Hum.-Soc. Elective*.....3	EE	301	Engr. Instrumentation...3	IE	360	Engr. Ec. Anal.3

SENIOR YEAR

ME	439	Mech. Engr. Design I.....4	ME	515	Thermodynamics of Power Systems.....4	ME	452	Advanced Projects II.....2
ME	521	Heat Transfer.....4	ME	415	Heat Transfer & Fluid Mech. Lab.....2	ME	420	Thermal Systems Laboratory.....2
ME	527	Dynamics of Physical Systems.....4	ME	442	Compr. Aid Des.....3			Hum.-Soc. Elective*.....10
ME	412	Measurements Lab.....2	ME	451	Adv. Projects I.....1			Technical Elective.....5
		Hum.-Soc. Elective*.....2	ME	522	Transport or			
		Technical Elective**.....3	ME	524	Energy Util.....3			
					Hum.-Soc. Elective*.....2			
					Technical Elective.....3			

TOTAL — 209 QUARTER HOURS

*See section on Humanistic-Social Electives.

**Six hours of Advanced ROTC may be substituted for EE 303 (3 hrs.) and three hours of Technical Electives.

Materials Engineering

The curriculum in Materials Engineering is administered by the Department of Mechanical Engineering of the College of Engineering. It is an interdisciplinary curriculum conducted cooperatively by academic departments of the College of Engineering and the College of Sciences and Mathematics through a faculty Materials Engineering Curriculum Committee.

Materials Engineering includes both the design of materials and materials processes to meet specific needs. Materials engineers are employed in the basic metallurgical, ceramics, plastics, electronics, aerospace, mechanical, process, chemical, and nuclear power industries.

The curriculum in Materials Engineering includes the basic sciences, engineering sciences, and particularly the science of the relationship of structure to properties.

Materials Engineering courses include the subjects of ceramic, metallic, and plastic materials design with the emphasis placed upon the structure of each type and its influence on the properties and performance in service. Fundamental relationships are emphasized to prepare the engineer to meet effectively modern design challenges that will be encountered.

Curriculum in Materials Engineering (MTL)

FRESHMAN YEAR

(See Pre-Engineering Curriculum)

SOPHOMORE YEAR

First Quarter			Second Quarter			Third Quarter		
MH	264	An. Geom. & Cal. ....5	PS	222	Gen. Physics III.....3	ME	301	Thermodynamics I.....4
PS	221	Gen. Physics II.....3	PS	222L	Gen. Physics Lab. III.....1	MH	362	Engr. Math. I.....3
PS	221L	Gen. Physics Lab. II.....1	MH	265	Linear Diff. Equations...3	MTL	320	Mats. & Prop. II.....4
ME	205	App. Mech.—Statics.....4	MTL	220	Mats. & Prop. I.....3	PS	320	Modern Physics for Engineers.....3
MTL	210	Struct. of Materials.....3	EGR	207	Strength of Mats. I.....3	ME	208	Engr. & Comp. Math.....3
		Basic ROTC or Elect.....3			Elective.....3			

JUNIOR YEAR			
CH 507 Physical Chemistry5	CH 508 Physical Chemistry or	MTL 337 Phys. Anal. of Mats. II . . .4	
MTL 338 Phase Diagrams4	CH 207 Organic Chemistry5	MTL 436 E.M.S. Ferrous	
EE 302 Intr. to EE I3	EE 301 Engr. Instrument3	Metallurgy3	
Hum.-Soc. Elective*3	MTL 336 Phys. Anal. of Mats. I . . .4	MTL 448 Intr. to Ceramics3	
Tech. Elective3	EHA 304 Tech. Writing3	Hum.-Soc. Elect.*3	
	Hum.-Soc. Elective*3	Tech. Elective3	
SENIOR YEAR			
MTL 435 Phys. Anal. of Mats. III . . .4	MTL 447 Mech. of Engr. Mats. . . .4	MTL 446 Theor. Mats. Engr.3	
MTL 515 Polymer Tech. I4	MTL 513 Intr. to X-ray	MTL 570 Elect. Prop. of Mats. . . .3	
MTL 550 Thermo. of Mats. Syst. . .4	Crystallography5	MTL 452 Adv. Projects II2	
Tech. Elective5	MTL 516 Polymer Tech. II3	ME 521 Heat Transfer4	
	MTL 575 Rate Processes in Mats. .3	Hum.-Soc. Elective*5	
	ME 451 Adv. Projects I1		
	Hum.-Soc. Elective*3		

TOTAL — 210 QUARTER HOURS

*See section on Humanistic-Social Electives.

†Six hours of Advanced ROTC may be substituted for six hours of Technical Electives.

NOTE: The sequence CH 111 and CH 112 may be substituted for the sequence CH 103/CH 103L and CH 104/CH 104L.

SUGGESTED TECHNICAL ELECTIVES

Selected from approved list which can be obtained from the chairman of the Materials Engineering Curriculum Committee.

Department of Textile Engineering

The programs in the Department of Textile Engineering are designed to be sufficiently flexible to serve the needs of the student who seeks a career in the textile industry. Textiles is a truly multi-disciplinary program, and frequently a career in this field will draw on knowledge from the sciences, arts, combinations of these, economics, business and others.

The curricula are planned to provide for the needs of students as perceived by them and assisted by the faculty of the department.

Well equipped laboratories complement the lecture program. These laboratories represent the types of equipment, bench study and research capabilities so vital to the learning of and contributing to a career in the industry.

The size and diversity of textiles and the allied industries provide careers in manufacturing, research, machinery design, chemicals and dyestuffs, sales, styling and design, technical service and others. Too, the student has the opportunity to prepare for graduate school if he or she desires.

For those students who want to plan their education path in conjunction with industrial experience the Alabama textile industry cooperates with the Department of Textile Engineering through the Cooperative Education Program.

The Textile Engineering Department conducts both applied and fundamental research. In cooperation with the Engineering Experiment Station and other segments of the University, the Department serves textiles through the utilization of its facilities. In conjunction with research undertaken by the faculty, undergraduates may have the opportunity to conduct research in areas of their special interest. Graduate students are used when possible to conduct approved research that may be applied toward their graduate program requirements.

The Department of Textile Engineering offers three curricula to prepare for a career in one of the many facets of the industry. Textile courses in these curricula are combined with courses offered by other departments of the University to provide basic instruction in the fundamental sciences, engineering, technology and humanistic-social studies. The three curricula are:

Textile Chemistry — Students in this curriculum study the chemistry and physics of natural and man-made fibers and the theory and practice of textile dyeing and finishing. It prepares students for graduate work and careers as chemists and dyers in the textile, man-made fibers, dyestuff and other industries allied to textiles.

Textile Engineering — The curriculum in Textile Engineering offers study in basic engineering. It includes engineering science, humanistic-social studies, and the textile subjects needed for a fundamental understanding of the textile processes, materials and

industry. It prepares students for graduate study and careers in textile research, engineering, production and management in the primary textile industry and allied industries, such as the manufacture of textile machinery and man-made fibers.

Textile Management and Technology — This curriculum prepares students for production, administrative, and managerial positions in a textile career. In their junior and senior years students select courses in other disciplines through a technical elective sequence. These courses are from disciplines such as Consumer Affairs, Economics, Industrial Engineering, Management and Marketing. Entering students who are not proficient in college algebra are required to take 5 hours of algebra for no credit toward graduation.

Curriculum in Textile Chemistry (TC)

FRESHMAN YEAR		
First Quarter		
CH 111 Gen. Chem.	4	
CH 111L Gen. Chem. Lab.	1	
EH 101 English Comp.	3	
MH 161 An. Geom. & Cal.	5	
TE 102 Intr. Text. Engr.	2	
Second Quarter		
CH 112 Gen. Chem.	4	
CH 112L Gen. Chem. Lab.	1	
EH 102 English Comp.	3	
MH 162 An. Geom. & Cal.	5	
TT 211 Yarn Form. Syst.	5	
Third Quarter		
CH 113 Gen. Chem.	4	
CH 113L Gen. Chem. Lab.	1	
EH 103 English Comp.	3	
MH 163 An. Geom. & Cal.	5	
TT 221 Fab. Form. Syst.	5	
SOPHOMORE YEAR		
CH 207 Organic Chem.	4	
CH 207L Organic Chem. Lab.	2	
MH 264 An. Geom. & Cal.	5	
PS 220 Gen. Physics	3	
PS 220L Gen. Physics Lab.	1	
HY 121 Tech. & Civil. I.	3	
CH 208 Organic Chem.	3	
CH 208L Organic Chem. Lab.	2	
MH 265 Lin. Diff. Eq.	3	
PS 221 Gen. Physics	3	
PS 221L Gen. Physics Lab.	1	
TT 204 Comp. in Text.	3	
HY 122 Tech. & Civil. II.	3	
JUNIOR YEAR		
CH 204 Anal. Chem.	3	
CH 204L Anal. Chem. Lab.	2	
TT 350 Test. of Tex. Mat'l's	5	
TE 431 Struct. & Prop.	5	
Fib. & Polymers	5	
TE 432L Fibers	2	
CH 205 Anal. Chem.	5	
ACF 215 Fund. of Acct'g.	4	
EHA 304 Tech. Writing	3	
TE 340 Chem. Proc. I.	5	
IE 410 Engr. Statistics	5	
EC 200 Gen. Economics	5	
TE 341 Chem. Proc. II.	5	
TMT 342 Anal. Instr. in Text.	3	
SENIOR YEAR		
CH 507 Physical Chem.	5	
EC 202 Gen. Economics II.	5	
Hum.-Soc. Elective	3	
TC 441 App. Dye. Theory	5	
CH 508 Physical Chem.	5	
TC 490 Undergrad. Rsch.	5	
Tech. Elective*	8	
TC 491 Undergrad. Rsch. II.	5	
TC 560 Text. Finishes	4	
Tech. Elective*	9	

TOTAL — 209 QUARTER HOURS

Six hours of Basic ROTC may be substituted for SC 111 and 1 hour of Hum.-Soc. elective. Six hours of advanced ROTC may be substituted for 6 hours of technical electives.

*Selected from an approved list (See Department).

Curriculum in Textile Engineering (TE)

FRESHMAN YEAR		
First Quarter		
EH 101 English Comp.	3	
CH 103 Fund. Chem. I.	4	
CH 103L Fund. Chem. I (L)	1	
MH 161 An. Geom. & Cal.	5	
IE 102 Graphics	3	
TE 102 Intr. Text. Engr.	2	
Second Quarter		
EH 102 English Comp.	3	
CH 104 Fund. Chem. II.	4	
CH 104L Fund. Chem. II (L)	1	
MH 162 An. Geom. & Cal.	5	
TT 211 Yarn Form. Sys.	5	
Third Quarter		
EH 103 English Comp.	3	
PS 220 Gen. Physics I.	3	
PS 200L Gen. Physics I (L)	1	
MH 163 An. Geom. & Cal.	5	
TT 221 Fab. Form Sys.	5	
SOPHOMORE YEAR		
CH 207 Organic Chem.	4	
CH 207L Organic Chem. (L)	1	
PS 221 Gen. Physics II.	3	
PS 221L Gen. Physics II (L)	1	
MH 264 An. Geom. & Cal.	5	
TT 350 Textile Testing	5	
CH 208 Organic Chem.	3	
CH 208L Organic Chem. (L)	2	
PS 222 Gen. Physics III.	3	
PS 222L Gen. Physics III (L)	1	
MH 265 Lin. Dif. Eq.	3	
TT 204 Computers in Text.	3	
Hum.-Soc. Elective	3	
ME 202 Structures	3	
ME 205 App. Mech. Stats.	4	
TE 362 Tex. Thermodynamics	4	
PA 212 Intr. Sc. Reas.	3	
SC 111 Speech Communic.	5	

ME 321 Dynamics I	4	EC 200 Gen. Economics	5	EC 202 Economics II	5
TE 363 Textile Thermodynamics II	4	TE 340 Chem. Proc. I	5	TE 341 Chem. Proc. II	5
TE 431 Struc. & Prop. of Fibers & Polymers	5	TE 360 Mech. Flex. Struc.	5	TE 355 Numerical Methods and Comp. Applic.	3
TE 432 Fibers Lab	2	HY 122 Tech. & Civil.	3	EE 302 Intr. Elec. Engr.	3
HY 121 Tech. & Civil.	3			HY 123 Tech. & Civil.	3

JUNIOR YEAR

EHA 304 Tech. Writing	3	IE 360 Engr. Econ. Anal.	3	EGR 491 Legal Aspects	3
IE 410 Engr. Statistics	5	TE 490 Undergrad. Res.	5	IE 508 Ergonomics	5
TE 456 Instr. & Control Engr. Elective	3	Engr. Elective	7	TE 491 Undergrad. Res. II	5
				TE 494 Special Prob.	3

TOTAL — 210 QUARTER HOURS

Six hours of basic ROTC may be substituted for SC 111 and one hour of Hum.-Soc. elective.

Six hours of advanced ROTC may be substituted for EHA 304 and EGR 491.

Curriculum in Textile Management and Technology (TMT)**FRESHMAN YEAR**

First Quarter		Second Quarter		Third Quarter	
EH 101 English Comp.	3	EH 102 English	3	EH 103 English Comp.	3
CH 103 Gen. Chem.	4	CH 104 Fund. of Chem. II	4	CH 203 Org. Chem.	5
CH 103L Gen. Chem. Lab.	1	CH 104L Fund. of Chem. Lab.	1	MH 169 Bus. Math. w/Cal.	5
MH 160 Pre. Cal. w/Trig.*	5	MH 161 An. Geom. & Cal.	5	TT 221 Fab. Form. Syst.	5
TE 102 Intr. Text. Engr.	2	TT 211 Yarn Form. Syst.	5		
IE 102 Graph. Com. & Desgn.	3				

SOPHOMORE YEAR

PS 205 Intr. Physics	3	SC 111 Public Speaking	5	EC 200 Gen. Economics	5
PS 205L Intr. Physics Lab.	1	TT 204 Comp. in Text.	3	TMT 232 Text. Fibers II	5
TMT 241 Dye. & Finish	5	TMT 231 Text. Fibers I	5	TMT 212 Spec. Topics Yarn Mfg.	4
HY 121 Tech. & Civil. I	3	HY 122 Tech. & Civil. II	3	HY 123 Tech. & Civil. III	3
Hum.-Soc. Elective	3				

JUNIOR YEAR

EC 202 Economics II	5	MN 310 Prin. of Mgt.	4	MT 255 Legal Envir. of Bus.	4
MN 274 Bus. & Econ. Stat.	5	TMT 242 Chem. Tech. Blch. Dyeing & Finish.	3	AC 215 Fund. Account.	4
TT 350 Test. Text.	5	TMT 320 Cont. of Fab. Str.	5	TMT 322 Non-Con. Fab. Struc.	2
TMT 311 Textured Yarns	2	TMT 325 Design Text. Fab.	4	TMT 342 An. Instr. in Text.	3
				TMT 351 An. Text. Fab. Struct.	5

SENIOR YEAR

EHA 304 Tech. Writing	3	TMT 482 Tex. Mgt.	3	TMT 491 Undergrad. Resch. II	5
MT 331 Prin. of Mktg.	5	TMT 490 Undergrad. Resch. I	5	Hum.-Soc. Elec.	3
TMT 352 Text. Qual. Control	3	MN 442 Pers. Mgt.	4	Tech. Elec.**	7
TMT 480 Plt. Des. & Cost Con.	4	Tech. Elec.**	4		

TOTAL — 199 QUARTER HOURS

*Entering students not well grounded in college algebra must take MH 140-5, college algebra, which does not count in total hours toward graduation.

**Selected from an approved list (See Department).

Six hours of Basic ROTC may be substituted for SC 111 and one hour of Hum.-Soc. elective.

Six hours of advanced ROTC may be substituted for six hours of technical electives.



School of Forestry

EMMETT F. THOMPSON, *Dean*
JOHN G. HAYGREEN, *Associate Dean*

THE SCHOOL OF FORESTRY offers curricula leading to bachelor of science degrees in forest management and forest products. A curriculum leading to the bachelor of science in forest engineering is offered in conjunction with the College of Engineering. The School also offers an Honors program which leads to the degree of Bachelor of Science in Forestry (Honors Program).

The forest management degree is appropriate for students who seek employment with the forest products industry in either land management or raw material supply, as well as prepares students for careers with various public agencies and consulting firms. Students interested in careers in forest products processing or technical sales are enrolled in forest products. The forest engineering curriculum combines professional courses in engineering and forestry for students who want careers in the forest industries that require training in both engineering and forestry.

The School of Forestry is accredited by the Society of American Foresters to offer professional Forestry education in the approved curricula of Forest Management and Forest Engineering. The Forest Engineering curriculum is designed to also meet accreditation requirements of the Accreditation Board for Engineering and Technology.

Within the University's overall purpose and direction, the School of Forestry's goals are to develop excellence in forestry education and research in a manner compatible with the needs of forestry and forest products firms in the southeastern United States. With respect to undergraduate education, excellence means graduating individuals who have the necessary skills for initial employment as well as the breadth and depth of educational background to support career advancement. The School's orientation in achieving excellence is toward the forest products industry and the raw material base which supports the industry, while fully recognizing that proper concern for raw material supply includes responsible stewardship of the total forest resource.

Admission

Freshmen eligibility is determined by the Admissions Office. However, since the requirements for forestry education necessitate high school preparatory work of high intellectual quality and of considerable breadth, the following program is recommended as *minimum* preparation: English, four units; mathematics (including algebra, geometry, trigonometry, and analytical geometry), four units; chemistry, one unit; biology, one unit; history, literature, social science, two or three units. Physics and foreign language are recommended but not required.

Transfers from other institutions must apply through the Admissions Office. The exact placement of transfer students can be determined only upon review of their transcripts by the School of Forestry. Transfer credit will not normally be allowed for any course with a grade lower than C at another college or university.

Credit toward a degree in any curriculum in the School of Forestry will not be allowed for mathematics, chemistry, or physics courses at a level lower than those specified in the curriculum for the degree sought. However, students who are not prepared to take the course prescribed may take lower level courses without degree credit.

Transfer credit for forestry subjects not considered equivalent to those required in the chosen curriculum may be substituted for elective credit; however, duplication of credit will not be allowed. Equivalency of forestry subjects will be determined by the Dean's Office; however, students may also obtain transfer credit on the basis of validating examinations. Arrangements for validating examinations must be made with the Dean of Forestry in the first quarter of the student's enrollment in the School of Forestry and the examinations must be completed before the middle of the second quarter. Transfer credit for courses considered upper division courses at Auburn University will not be accepted from two-year colleges.

Forest Engineering

Forest Engineering is a multi-disciplinary science dealing with two of our most important natural resources — timber and land — and the mechanical devices and processes for their efficient utilization. Forest engineers are professionally trained to apply engineering and forestry principles to solve operations problems in regenerating, growing, harvesting, handling, transporting, and processing timber. In addition, they also deal with the engineering problems related to other forest resources.

The curriculum is coordinated by the College of Engineering and the School of Forestry. Students register in the College of Engineering and are assigned academic advisers in Agricultural Engineering and in Forestry. Beginning students should apply to the College of Engineering and complete the Pre-Forest Engineering program. For qualified forestry students who develop an interest in Forest Engineering during the freshman year, an alternate course sequence for completion of the Pre-Forest Engineering program under the guidance of an Agricultural Engineering and a Forestry adviser is available in the School of Forestry.

Forest Engineering

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
MH	161 An. Geom. & Cal.* .....5	MH	162 An. Geom. & Cal. ....5	MH	163 An. Geom. & Cal. ....5
CH	103 Fund. Chem. & Lab. ....5	CH	104 Fund. Chem. & Lab. ....5	PS	220 Gen. Physics I .....4
IE	102 Graph. Comm. & Design .....3	EH	102 English Comp. ....3	EH	103 English Comp. ....3
EH	101 English Comp. ....3		Hum.-Soc. Elective .....3		History or Lit.*** .....3
	History or Lit.*** .....3		History or Lit.*** .....3		

SOPHOMORE YEAR

MH	264 An. Geom. & Cal. ....5	ME	301 Thermodynamics I .....4	ME	321 Dynamics I .....4
PS	221 Gen. Physics II .....4	PS	222 Gen. Physics II .....4	EGR	207 Mech. of Solids .....3
EGR	205 Appl. Mech. Stat. ....4	MH	265 Diff. Equat. ....3	BI	102 Plant Biology .....5
FYE	201 Engr. Prin. in Agri. and Forestry .....5	BI	101 Prin. of Biology .....5	AEC	202 Ag. Econ. II .....5

SUMMER CAMP**

FY	307 Intr. to Forest Oper. and Mgmt. ....3
FY	301 Dendrology I .....3
FYE	304 Forest Surveying .....5
FY	305 Field Mensuration .....4

JUNIOR YEAR

FY	315 For. Measurements .....3	FY	316 Inventory Design .....3	FY	423 Forest Ecology .....4
IE	410 Engr. Statistics .....5	FYE	311 Fund. of Mobile Equip. Design .....5	FYE	401 For. Machinery .....3
CE	310 Hydraulics I .....3	CE	430 Intr. Soil Mechanics .....5	EE	302 Intr. Elec. Engr. I .....3
	Hum.-Soc. Elective .....3	EGR	420 Prof. Prac. in Engr. ....1	FY	317 Growth & Yield .....3
EHA	304 Tech. Writing or		Hum.-Soc. Elective .....4	FYE	509 Hyd. Control Syst. ....5
EHA	315 Bus. & Prof. Report Writing .....3				

SENIOR YEAR

FY	540 Forest Econ. ....4	FY	541 For. Mgt. & Admin. ....4	FY	543 Forest Policy .....2
FY	523 Silviculture .....4		Engr. Elective .....4	FYE	530 Engr. Design for Biological Systems II .....4
CE	350 Transportation Engr. ....3		Hum.-Soc. Elective .....5	EE	303 Intr. Elec. Engr. II .....3
FYE	403 App. Struct. Analysis & Design .....3	FYE	430 Engr. Design for Biological Systems I .....4	FYE	572 Engr. Design of For. Harvesting Systems .....5
	Dir. Engr. Elective† .....5				

TOTAL — 225 QUARTER HOURS

*Students whose combined ACT scores for English and Mathematics are lower than 50, or whose total SAT scores are less than 1100, are enrolled in MH 160 for no credit.

**Students must be in residence at camp. BI 102 is a prerequisite for summer camp.

***Selected from one of the following sequences: HY 101-102-103; HY 121-122-123; EH 260-261-262.

†Selected from one of the following sequences: EC 202 or AEC 206.

††Directed Engineering Elective must be selected from the following: CE 311, CE 360, ME 302, ME 316, or ME 322 and 323.

Forest Management

The objectives of the Forest Management curriculum are to provide: (1) fundamental knowledge regarding the resources that professional foresters typically manage and the multiple uses of those resources. (2) a general education integrating physical, social, and biological sciences to prepare the forester for his role as a steward of public and private forest resources. (3) training in skills needed for initial forestry employment as well as for advancement to higher levels of managerial responsibility.

By appropriate selection of electives, forest management majors may earn a minor in business.

Forest Management (FY)

FRESHMAN YEAR				
First Quarter		Second Quarter		
BI	101 Prin. of Biology.....	5	BI 102 Plant Biology.....	5
EH	101 English Comp.	3	MH 161 An. Geom. & Cal.***	5
	History or Lit.*	3	EH 102 English Comp.	3
	Elective**	5	History or Lit.	3
CH	101 Intr. Chemistry I.....	2	CH 102 Intr. Chemistry II.....	2
EC	200 Economics.....	5	CH 103L Chemistry Lab.....	1
SC	100 Speech.....	3	EC 202 Economics.....	5
	Elective**.....	6	AC 215 Accounting.....	4
			Elective**.....	5
SOPHOMORE YEAR				
		SUMMER CAMP		
		FY	301 Dendrology I.....	3
		FYE	304 Forestry Surveying.....	5
		FY	305 Field Mensuration.....	4
		FY	307 Intr. to Forest Oper. & Mgt.....	3
JUNIOR YEAR				
FY	315 For. Measurements.....	3	FY 316 Inventory Design.....	3
FY	320 Tree Physiol.....	3	AY 305 Gen. Soils.....	5
FY	312 Dendrology II.....	2	FP 339 Wood ID & Prod.....	3
BST	215 Bio. Statistics.....	5	EHA 304 Tech. Writing or	
	Elective**.....	3	EHA 315 Bus. & Prof. Report	
			Writing.....	3
			Elective**.....	3
SENIOR YEAR				
FY	540 Forest Econ.....	4	FY 541 Forest Mgt. & Admin.....	4
FY	523 Silviculture.....	4	FY 444 Fire Control & Use.....	2
FY	524 Watershed Mgt.....	2	FYE 570 Harvesting.....	3
	Elective**.....	6	ZY 425 Forest Wildlife Mgt.....	3
			Elective**.....	3
Third Quarter				
FY	200 Intr. to Forestry & Wood Products.....	3		
MH	169 Business Mathematics with Calculus.....	5		
EH	103 English Comp.....	3		
	History or Lit.....	3		
	Elective**.....	3		
CH	104 Fund. Chemistry.....	4	CH 104L Chemistry Lab.....	1
PS	200 Found. Physics.....	5		
FY	220 Cmptr. Appl. in For.....	3		
	Elective**.....	3		
FY	317 Growth and Yield.....	3		
FY	423 Forest Ecology.....	4		
FY	446 Forest Pests.....	4		
	Elective**.....	5		
FY	484 For. Mgt. Practicum.....	4		
FY	543 Forest Policy.....	2		
	Elective**.....	11		

TOTAL — 210 QUARTER HOURS

*Select one sequence: HY 101-102-103; HY 121-122-123; or EH 260-261-262.

**Two electives must be in the Humanities/Social Sciences, one from Directed Electives I list, three from Directed Electives II list, and two from Technical Electives list. Maximum of 10 hours of unrestricted electives can be used toward graduation. Approved Humanities/Social Sciences include University Courses 105, 270, 271, and 272; all Anthropology, Art, English, Foreign Language, Music, Philosophy, Political Science, Psychology, Religion, Sociology, and Theatre courses; and all History courses numbered above 200. Directed Electives I includes FY 422, 417, 463, and 465. Directed Electives II includes FY 425, 429, 482, MN 310, MT 331, and FI 361. The Technical Electives list is available in the Dean's office.

***Students whose combined ACT scores for English and Mathematics are lower than 50, or whose total SAT scores are less than 1100, are enrolled in MH 160 for no credit.

Honors Program in Forestry

The Honors Program in Forestry provides able students the opportunity to explore in depth areas in which they are interested and to prepare for graduate school. The program is flexible, permitting concentration of effort in areas of the student's choosing.

Students with at least five quarters remaining in the Forest Management curriculum and with a grade point average of 2.9 or better may apply for admission to the program.

First Quarter			JUNIOR YEAR			Third Quarter		
FY	315	For. Measurements .....3	FY	316	Inventory Design .....3	FY	317	Growth & Yield .....3
FY	320	Forest Tree Physiol. ....3	AY	305	Gen. Soils .....5	FY	423	Forest Ecology .....4
BST	501	Bio. Statistics .....5	EHA	304	Tech. Writing or			Elective* .....9
		Electives* .....5	EHA	315	Bus. & Prof. Report			
					Writing .....3			
					Elective* .....6			
			SENIOR YEAR					
FY	540	Forest Econ. ....4	FY	541	Forest Mgt. & Admin. ....4	FY	484	For. Mgt. Practicum ....4
FY	523	Silviculture .....4	FY	499	Honors Project .....2-5			Electives* .....13
		Electives* .....8			Electives*6-9			

TOTAL — 210 QUARTER HOURS

*Two electives must be in the Humanities/Social Sciences. Thirty-five hours of electives are to be chosen under the supervision of the faculty adviser so as to develop a distinct program leading to a pre-determined goal. All other elective hours are free.

Forest Products

The Forest Products curriculum is intended for students interested in careers in the manufacture, marketing, or design of wood-base building materials. The curriculum provides an understanding of the properties of wood and of the technology of manufacturing fiber, particle, and solid wood products. Also, students develop an understanding of business and management practices to prepare them for a variety of business or management careers.

Forest Products (FP)

First Quarter			FRESHMAN YEAR			Third Quarter		
EH	101	English Comp. ....3	EH	102	English Comp. ....3	EH	103	English Comp. ....3
HY	101	World History .....3	HY	102	World History .....3	HY	103	World History .....3
MH	161	An. Geom. & Cal.* ....5	MH	169	Bus. Math w/Cal. ....5	FY	200	Intr. to For.
BI	101	Prin. of Biology .....5	BI	102	Plant Biology .....5			& For. Products .....3
						FY	220	Com. App. in For.* **3
						CH	103	Fund. of Chem. I
								& Lab .....5
			SOPHOMORE YEAR					
CH	104	Fund. of Chem. II	CH	203	Org. Chem. & Lab .....5	PS	206	Intr. to Physics
		& Lab .....5	PS	205	Intr. to Physics			& Lab .....4
BST	215	Intr. Bio. Sta .....5			& Lab .....4	AC	215	Fund. of Gen. &
SC	200	Speech .....3	EC	200	Economics I** .....5			Cost Acct. ....5
		Elective .....3	FP	339	Wood Idn. & Prod. ....3	FP	206	Wood Measurements ....3
						EC	202	Economics II** .....5
			JUNIOR YEAR					
MT	331	Prin. of Marketing .....5	FP	330	Solid Wood	AC	213	Managerial Cost &
EHA	304	Tech. Writing .....3			Products .....3			Budgeting .....4
BSC	211	Mech. Structures .....5	FP	478	Intr. to Wood Chem. ....3	FI	361	Prin. of Business
		Elective .....3	FP	474	Wood Gluing &			Finance .....5
					Coating .....3	FP	475	Wood-Based Panel
			MN	310	Prin. of Mgt. ....5			Technology .....3
					Elective .....3			Elective .....3
			SENIOR YEAR					
FP	525	Phys. Prop. of Wood ....3	FP	531	Mech. Prop. of Wood ....4	FP	535	For. Products Prod.
FP	532	Deterioration & Wood	FP	533	Wood Drying Proc. ....3			Mgt. and Control .....3
		Treating Processes .....3	FP	536	Forest Prod. Mktg. ....3	MN	443	Labor Relations .....5
MN	342	Human Resources Mgt. 5	FY	590	Seminar .....1			Restricted Elect. ....8
		Restricted Elect. ****5			Restricted Elect.5			

TOTAL — 195 QUARTER HOURS

*Students whose combined ACT scores for English and Mathematics are lower than 50, or whose total SAT scores are less than 1100, are enrolled in MH 160 for no credit.

**AEC 200 and 202 sequence may be taken instead of EC 200 and 202

***AEC/BST 210, CSE 204, SCE 100 may be substituted for FY 220.

****Restricted Electives: AN 401, 402, 403, 430; CH 105-105L, 204-204L, 205, 207-207L, 208-208L, 209, 316; Any FY (except 350) or FYE course; IE 102, 300, 302, 342, 352, 410; ME 205, 207, 309, 316; MH 264, 265, 266; MN 346, 420; MT 333; MTL 202, 304; PS 207, 207L.

School of Human Sciences

JUNE M. HENTON, *Dean*

ARTHUR W. AVERY, *Associate Dean*

DOROTHY H. TATE, *Associate Dean*

DOROTHY H. CAVENDER, *Assistant Dean*

PAULETTE P. HILL, *Assistant Dean*

HUMAN SCIENCES is a professional program drawing on a foundation from the natural and social sciences, the arts, and humanities. It integrates and interrelates knowledge from these disciplines to promote the well-being of individuals and families. The course of study provides students with a broad liberal education, specialized career preparation, as well as a background for individual and family living. Areas of specialization focus on many aspects of environment, health, and human development. Human Sciences offers men and women professional and pre-professional preparation for a variety of careers available in education, business, industry, social agencies, and government.

Programs of study leading to the Bachelor of Science degree can be planned within ten curricula in the School of Human Sciences. These curricula are designed with flexibility to meet the needs of students with varying interests. The School includes the Departments of Consumer Affairs, Family and Child Development, and Nutrition and Foods.

Students within any curricula may elect to complement their major area of study with a multi-disciplinary Certificate in Aging Studies, composed of 25 hours. Students should contact the Academic Adviser for further information.

Graduation Requirements To earn the bachelor's degree from the School of Human Sciences, students must complete the hours and subject matter requirements of their curricula and must have a minimum cumulative grade-point average of 2.0 on all course work attempted at Auburn University, and **in addition, a 2.0 cumulative GPA on all work attempted in the major.**

Transfer credit will not normally be allowed for any course passed with a grade lower than C at any other college or university.

Department of Consumer Affairs

The Department of Consumer Affairs focuses on the near physical environment and resources, including personal interaction with this environment. Four majors are offered in this department: Apparel and Textiles; Fashion Merchandising; Interiors and Housing; and Consumer and Family Economics. These curricula lead to careers in business and government which apply science and technology to study consumer needs, to evaluate consumer products, and to inform consumers of the findings.

Apparel and Textiles

Apparel and Textiles is a professional curriculum with four options providing preparation and specialization related to students' professional goals. Diversity within the major allows students to select among such varied fields as apparel and textile design, fashion promotion, fashion journalism, apparel production management, consumer-producer relations, and textile science. Located in the heart of the textile and apparel industry, a unique interdisciplinary structure exists between Apparel, Textiles, Textile Engineering, the College of Business, the Agricultural Experiment Station (research), and the Cooperative Extension System on the campus.

Admission of majors to the Textile Design option of this curriculum is temporarily suspended.

Curriculum in Apparel and Textiles (APT)

Options*: Apparel Design, Apparel Production Management,
Textile Design, and Textile Science
Curriculum Core — 99 hours

EH	101 English Comp.	3	CH	103LGen. Chem. Lab	1
EH	102 English Comp.	3	CH	104 Fund. of Chemistry II	4
EH	103 English Comp.	3	CH	104LGen. Chem. Lab	1
PA	111 Basic Reason. or		CH	203 Organic Chemistry**	5
PA	211 Intr. to Deduct. or		SC	140 App. Speech Comm.	3
PA	212 Intr. Sci. Reason.	3	EHA	315 Business & Profess. Writ. or	
HY	101 World History	3	JM	315 Tech. Journalism	3
HY	102 World History	3	PG	211 Psychology	5
HY	103 World History	3	SY	201 Intr. to Sociology	5
	or		FL	Foreign Languages***	5
HY	121 Tech. & Civil. I	3		Fine Arts****	3
HY	122 Tech. & Civil. II	3	NF	200 Nutrition and Health	3
HY	123 Tech. & Civil. III	3	FCD	157 Fam. and Human Dev.	3
EH	Literature	6	CA	115 Clothing and Man.	3
MH	160 Pre-Calculus with Trig. or		CA	116 Art for Living I	3
MH	161 Anal. Geom. & Calc.	5	CA	116L Art for Living Lab.	2
EC	200 Economics I	5	CA	200 Mgt. for Consumers	4
CH	103 Fund. of Chemistry	4	CA	305 Textiles	5

*Students focus on one of four options, taking specified professional courses, approved professional electives, and 10-16 hours of free electives.

**Students in the Textile Science option omit CH 203 and take CH 207, 207L.

***Satisfactory completion of the third course in the 100-level in any foreign language sequence.

****Any fine arts course, e.g., music, art, theatre.

ELECTIVES*

Specified Professional Courses — 38-78 hours

Approved Professional Electives — 18-52 hours

Free Electives — 10-16 hours

TOTAL — 205 QUARTER HOURS

Consumer and Family Economics

The curriculum in Consumer and Family Economics prepares students for professional positions dealing primarily with the economic and resource management problems of individuals and families. These include positions in the following areas: credit/debt counseling; consumer protection with local, state, and federal agencies; business and industry; and the Cooperative Extension System.

Curriculum in Consumer and Family Economics (CFE)

First Quarter			FRESHMAN YEAR			Third Quarter		
			Second Quarter					
MH	160 Pre-Cal w/Trig	5	BI	105 Persp. in Biol.	5	BI	107 Environ. Biol.	5
CA	116 Art for Living I	3	EH	102 English Comp.	3	PG	211 Psychology	5
EH	101 English Comp.	3	HY	122 Tech. & Civil. II or		EH	103 English Comp.	3
FCD	157 Fam. & Human Dev.	3	HY	102 World History	3		Elective	5
HY	121 Tech. & Civil. or		SC	140 App. Speech Comm.	3			
HY	101 World History	3						
			SOPHOMORE YEAR					
EC	200 Economics I*	5	EC	202 Economics II	5	EH	Literature	3
HY	123 Tech. & Civil. III or		SY	201 Intr. to Soc.	5		Prof. Elective	5
HY	103 World History	3	CA	220 Consumer Hous.	3	NF	200 Nutr. & Health	3
CA	200 Mgt. for Cons.	4	FL	Foreign Language	5	PG	212 Dev. Psych.	5
PS	200 Found. Phys.	5						
			JUNIOR YEAR					
PA	111 Basic Reas. or		MN	310 Prin. of Mgt.	4	CA	541 Fam. Fin. Mgt.	5
PA	211 Intr. Deduct. Log. or		MT	331 Prin. of Mkt.	5	MT	341 Buyer Behav.	5
PA	212 Intr. Sci. Reas.	3		Prof. Elective	7	CA	528 Cons. Econ.	5
EHA	315 Bus. Prof. Writ.	3	EH	Literature	3		Fine Arts	3
EH	Literature	3						
FCD	330 Life Span Hum.	5						
MN	207 Intr. Comp. Pro. or							
CSE	100 Intr. Pers. Comp.							
	Apps.	3						

SENIOR YEAR

CA 514 Soc. Prob. of Housing...5	CA 470 Alloc. Fam. Res. ....5	CA 438 Internship .....13
CA 530 Cons/Fam. Econ. ....5	Prof. Electives .....15	
Issues .....3		
Elective .....5		
Prof. Elective5		

TOTAL — 205 QUARTER HOURS

*A maximum of 51 credit hours, excluding EC 200, 202, and ACF 340, is allowed from the College of Business.

APPROVED PROFESSIONAL ELECTIVES

Select 32 hours from the following: CA 205, 222, 233, 513, 538; EC 340, 350, 360, 433, 551, 552, 554, 555, 556, 565; FCD 270, 306, 310, 477, 568; NF 202, 204, 324, 358, 362; AC 211, 212, 213, 311, 314; RSY 362, 541, 561, 562; MB 300; EHA 415, 516; MN 207, 274, 346, 381, 382; MT 255; JM 204, 315; SY 220, 370, 477; SW 375, 376, 575.

Fashion Merchandising

Fashion Merchandising prepares majors for such positions as buyer or assistant buyer, comparison shopper, fashion stylist or coordinator, merchandise manager, fashion promoter, or a store owner-manager. Ten weeks of retail training is included in the fashion merchandising curriculum.

Curriculum in Fashion Merchandising (FM)**FRESHMAN YEAR**

First Quarter			Second Quarter			Third Quarter		
MH 160 Pre-Calc. w/Trig. ....5			CH 103 Fund. of Chem. I .....4			CH 104 Fund. of Chem. II .....4		
CA 116 Art for Liv. I. ....3			CH 103L Gen. Chem. Lab. ....1			CH 104L Gen. Chem. Lab. ....1		
CA 116L Art for Liv. Lab. ....2			CA 115 Clothing & Man. ....3			EH 103 English Comp. ....3		
EH 101 English Comp. ....3			EH 102 English Comp. ....3			FCD 157 Fam. & Human Dev. ....3		
HY 101 World History or			HY 102 World History or			HY 103 World History or		
HY 121 Tech. & Civil. ....3			HY 122 Tech. & Civil. II .....3			HY 123 Tech. & Civil. III .....3		
			Fine Arts .....3			NF 200 Nutr. & Health3		

SOPHOMORE YEAR

CH 203 Org. Chem. ....5	CA 201 Retail Pric. ....3	CA 140 Apparel Prod. I. ....5
EC 200 Economics I. ....5	EC 202 Economics II .....5	AC 211 Prin. of Acc. I .....4
PG 211 Psychology .....5	SY 201 Intr. to Soc. ....5	SC 140 App. Sp. Comm. ....3
Elective .....3	CA 205 Textile App. Prod. ....3	EH Literature .....3
		Electives3

JUNIOR YEAR

CA 226 Fash. Sketch .....3	CA 316 Fash. Analysis .....5	CA 200 Mgt. for Cons. ....4
JM 315 Tech. Journ. ....3	MT 333 Merch. Mgt. ....5	CA 325 Fashion Merch. ....5
MT 331 Prin. of Mkt. ....5	CA 334 Intr. to Intern. ....2	CA 305 Textiles .....5
PA 111 Basic Reas. or	Prof. Elective .....5	Prof. Elective .....5
PA 211 Intr. Ded. Logic or		
PA 212 Intr. Sci. Reas. ....3		
EH Literature3		

SENIOR YEAR

FL Foreign Lang. ....5	CA 516 Apparel Qual. Eval. ....5	CA 435 Internship
CA 525 History of Cost. ....5	CA 521 World App. Trade,	in Retailing .....13
Prof. Electives .....5	Prod. Dist. ....4	
Elective .....4	CA 535 Textile Testing .....5	
	Prof. Elective4	

TOTAL — 205 QUARTER HOURS**Professional Electives**

Eight hours selected from among: CA 206, 320, 385, 395, 399, 511, 511L, 520, 523, 524, 538, 556, 583.

Eight hours from: AC 212; EC 206; MN 207, 274, 310, 346, 442; MT 241, 242, 332, 436, 437, 440; SY 505. Any justifiable course.

Special Focus in International Retailing

Students desiring a Special Focus in International Retailing should select the following courses as Professional Electives: MT 341, MT 440, and CA 538. CA 435 (internship) should be done in Europe, Asia, or Latin America. Some foreign language courses may also be used for professional electives.

One-Year Transfer Programs

Qualified students in Apparel and Textiles or Fashion Merchandising may apply for one-year transfer programs to be taken during the junior year. Programs are available with the Fashion Institute of Technology in New York in apparel and textile design or merchandising and the Southern Technical Institute in Marietta, Ga. in apparel engineering. Transfer programs are planned with an adviser so that transfer credits meet Auburn curriculum requirements while the student earns an Associate Degree from the transfer institution. For further information, contact the head of the Department of Consumer Affairs.

One-Quarter Internship Programs

Students majoring in Consumer & Family Economics, Fashion Merchandising, Interiors and Housing, or the Apparel Design and Apparel Production Management Options of the APT curriculum are required to arrange an internship away from campus during one quarter of the senior year. Such experiences can also be arranged for students in any Consumer Affairs major. To earn credit, internship site and work-study program must be approved by the student's adviser.

Interiors and Housing

Professional career opportunities for graduates in Interiors and Housing include designing, merchandising, and consulting positions with retailers, manufacturers, public utilities, and cooperative extension. A professional option for Kitchen and Bathroom Specialists is available through the IH curriculum and is endorsed by the National Kitchen and Bath Association.

Curriculum in Interiors and Housing (IH)

First Quarter			FRESHMAN YEAR			Third Quarter					
			Second Quarter								
MH	160	Pre-Calc. w/Trig.	5	AT	172	Hist. of Wld. Art.	3	CA	121	Spatial Analysis.	3
CA	116	Art for Liv. Lab.	3	EH	102	English Comp.	3	EH	103	English Comp.	3
CA	116L	Art for Liv. Lab.	2	BI	105	Persp. in Biology	5	AT	173	Hist. of Wld. Art.	3
EH	101	English Comp.	3			or		BI	106	Hum. Biology or	
AT	171	Hist. of Wld. Art.	3	CH	103	Fund. of Chem. I.	4	BI	107	Envir. Biology.	5
				CH	103L	Gen. Chem. Lab.	1			or	
				BSC	100	Draw. & Pro.	2	CH	104	Fund. of Chem. II.	4
				FCD	157	Fam. & Hum. Dev.	3	CH	104L	Gen. Chem. Lab.	1
								CH	200	Mgt. for Cons.	4
SOPHOMORE YEAR											
PS	200	Fnds. of Physics.	5	EC	200	Economics I.	5	EC	202	Economics II.	5
CA	220	Cons. Housing.	3	CA	233	Res. Equip./Energy		CA	222	Furn. for Int.	4
PG	211	Psychology.	5			Management.	4	CA	224	Fund. of Vis. Pres.	2
CSE	100	Intr. PC App.	3	CA	255	Text. for Ints.	3	NF	200	Nutr. & Health.	3
		Elective.	3	CA	221	Res. Space Plan.	4	CA	215	Sur. of Dec. Arts.	5
				EH		Elective.	3				
JUNIOR YEAR											
CA	324	Adv. Visual		CA	333	Lighting Des.	5	CA	353	Bus. Prac. in	
		Pres.	3	MT	331	Prin. of Mkt.	5			Int. Furn.	5
CA	223	Interiors.	4			Elective.	3	CA	424	Non-Res. Inter.	4
AC	211	Prin. of Acct.	4			Prof. Electives.	6	SC	111	Pub. Speak.	5
		Prof. Electives.	7					CA	363	Envir. Sys./Energy	
										Management.	3
SENIOR YEAR											
CA	422	Kit. & Bath Plan.	4	CA	423	Res. Interior.	4	CA	436	Internship.	13
CA	478	Vis. Merch.	3	CH	513	Hs. for Spec. Nds.	4				
EHA	415	Writ. Bus. Comm.	3			Lib. Ed. Elective.	5				
		Prof. Electives.	7			Prof. Elective.	3				
						Elective.	3				

TOTAL — 210 QUARTER HOURS

Suggested Professional Electives

Business and Consumer Orientation (minimum of 8 hours): ACF 212; CP 524, 545; MN 310; MT 241, 242, 332, 333, 337, 341; CA 325, 514, 528.

Applied Design (minimum of 6 hours): HF 225, 226; AT 101, 102, 103, 104, 105, 111, 112, 113, 121, 122, 123; FP 370; BSC 203; CA 216.

Design Support (minimum of 5 hours): BSC 202, 261, 262; AT 371, 372, 373, 374, 375, 376, 377, 378, 379; AR 261, 262, 263, 360; PG 465; ID 365, 366, 367; HF 221, 412; CA 399, 515, 580D; CP 525, 527; FP 301, 302, 439.

Note: The remaining four hours can be taken in any of the professional elective areas.

Kitchen and Bath Specialization

Students desiring a Kitchen and Bathroom Specialization should complete 23 hours in Professional Electives from the following: AC 212, BSC 203, MN 310, 414, MT 333, 337, 341, and FI 361. CA 436 — Internship in Interiors and Housing (13 credit hours) must be completed with a Kitchen and/or Bath Design firm. Completion of the Kitchen and Bathroom Specialization prepares the graduate to take the certification examination conducted by the Society of the National Kitchen and Bath Association. This professional option within the JH curriculum is endorsed by the National Kitchen and Bath Association.

Department of Family and Child Development

The Department of Family and Child Development is concerned with the processes of growth and development of individuals in their daily living from infancy to old age and with the creation of techniques for facilitating such development. Its primary mission is the promotion of self-fulfillment of individuals and families through maximum utilization of material and human resources. One curriculum, including three options, is offered in this department: Infancy and Preschool, School-age and Adolescence, and Adult and Aging.

Curriculum in Family and Child Development (FCD)

Options: Infancy and Pre-school, School-age and Adolescence, Adult and Aging.

Required Courses — 116-126 hours

EH	101-102-103 English Comp.	9	FCD	157 Fam. & Hum. Dev.***	3
SC	141 Gr. Prob. Solving	5	FCD	267 Hum. Dev. I	4
HY	101-102-103 World History	9	FCD	269 Family I	4
SY	201 Sociology	5	FCD	270 Family II	4
PG	211 Psychology		FCD	280 Hum. Dev. II	4
	or		FCD	287 Careers in FCD	2
PG	213 Psychology of Adjust.	5	FCD	300 Appr. Child Study	4
EC	200 Economics I	5	FCD	301 Hum. Dev. III	5
BI	105 Perspectives in Biology	5	FCD	302 Hum. Dev. IV	4
BI	106 Human Biology	5	FCD	306 Family III	4
CA	116 Art for Living I	3	FCD	347 Lab Exper. with Young Child	3
	Mathematics or Philosophy**	5	FCD	420 Recent Resch. in Child Dev.	4
CA	200 Mgt. for Cons.	4	FCD	477 Hum. Dev. V	3
NF	200 Nutr. and Health	3	FCD	497 Internship***	5-15

Electives 79-89 hours

Professional*	28-38
Liberal Education	18
General	33

TOTAL — 205 QUARTER HOURS

*Students focus on one of three options by taking 28-38 hours of specialized professional electives and a 5-15 hour directed internship.

**Students enrolled in the dual objective curriculum in Family & Child Development & Early Childhood Education are required to take MH 281.

***Students enrolled in the dual objective curriculum in Family and Child Development & Early Childhood Education are not required to take FCD 157 and FCD 497.

Department of Nutrition and Foods

The Nutrition and Foods major is designed for students having a strong interest in biological sciences, health, physical growth, and welfare of people, and the ability to apply scientific principles to the solution of problems. The sociological, psychological, physiological, and economic aspects of food as necessary to meet nutritional requirements are taught.

The department, through its majors in Coordinated Dietetics, Nutrition and Foods, Food Science, and Hotel and Restaurant Management, prepares students for teaching, research, and health service careers in educational institutions, hospitals, industry, and government.

Food Science

The Food Science curriculum is designed for students interested in careers found in the nation's gigantic food industry. Students may use their electives for a general program or for specializing in a commodity such as meat, fruit, or vegetable products. They may choose to emphasize business, technology, or science areas.

Curriculum in Food Science (FS)

FRESHMAN YEAR

First Quarter

CH	103	Gen. Chem. & Lab.	5
MH	160	Pre-Cal. w/Trig.	5
FS	201	Intr. Food Sci. & Tech.	3
EH	101	English Comp.	3
		Elective	1

Second Quarter

CH	104	Gen. Chem. & Lab.	5
MH	161	An. Geom. & Cal.	5
EH	102	English Comp.	3
HY	101	World History*	3
		Elective	1

Third Quarter

BI	101	Prin. of Biology	5
CH	203	Organic Chem. & Lab.	5
EH	103	English Comp.	3
HY	102	World History*	3
		Elective	1

SOPHOMORE YEAR

AEC	202	Agr. Econ. I	5
HY	103	World History*	3
NF	318	Nutr. Biochem.	5
		Elective	5

BI	102	Plant Biology	5
EHA	304	Tech. Writing	3
PS	200	Found. Phys.	5
		Elective	5

BI	103	Animal Biology	5
PG	211	Psychology	5
NF	372	Fund. of Nutr.	3
SC	111	Public Speaking	5

JUNIOR YEAR

FS	355	Food Engineering	5
FS	340	Indust. Food Pres. Tech.	5
MB	300	Gen. Microbiology	5
		Electives**	3

FS	543	Food Chemistry	5
		Electives**	12

FS	545	Food Analysis & Quality Control	5
FS	556	Food Microbiology	5
		Electives**	8

SENIOR YEAR

FS	577	Food Plant Sanit.	4
		Electives**	13

BST	501	Biol. Stat.	5
FS	429	Food Sci. Sem.	1
		Electives**	11

		Electives**	18
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TOTAL — 210 QUARTER HOURS

*HY 121-122-123 Tech. & Civil.; EH 260-261-262 Western World Literature; or AT 171-172-173 History of Art, may be substituted for HY 101-102-103.

**The student will complete a minimum of 50 hours, including 6 hours of Food Processing, from a list of approved professional electives.

Hotel and Restaurant Management

The Hotel and Restaurant major prepares students for administration in hotels, motels, restaurant facilities, and for other positions in the tourism and hospitality industry.

Curriculum in Hotel and Restaurant Management (HRM)

FRESHMAN YEAR

First Quarter

MH	140	College Algebra or	
MH	160	Pre-Cal. w/Trig.	5
BI	101	Prin. of Biology or	
BI	105	Persp. in Biology	5
EH	101	English Comp.	3
		HY/AT/EH*	3

Second Quarter

NF	101	Prin. Hosp. Mgt.	3
NF	200	Nutr. & Health	3
CH	103	Gen. Chem. I	4
CH	103L	Gen. Chem. Lab.	1
EH	102	English Comp.	3
		HY/AT/EH*	3

Third Quarter

CA	116	Art for Living	3
CA	116L	Art for Living Lab	2
EH	103	English Comp.	3
SC	304	Int. Public Rel.	5
		HY/AT/EH*	3

SOPHOMORE YEAR

NF	202	Prin. of Food Prep.	5
AC	211	Accounting I**	4
EHA	304	Tech. Writing or	
EHA	315	Bus. and Prof. Report Writing	3
PG	211	Psychology I	5

EC	200	Economics I	5
AC	212	Accounting II**	4
MB	201	Persp. in Microbiology	5
		Literature Elective	3

EC	202	Economics II	5
NF	204	Fd. Mgmt. for the Consumer	5
MN	310	Prin. of Mgt.**	4
FCD	330	Life Span/Human Development	5

JUNIOR YEAR

NF	304	Quant. Fd. Prep.	5
SC	111	Public Speaking	5
SC	340	Comm. Skills in Organizations	5
MN	442	Personnel Mgt.	4

EC	350	Labor Economics**	5
SY	201	Sociology	5
MT	241	Business Law**	4
FS	370	Meat Science	5

MT	331	Prin. of Mk.**	5
NF	346	Fd. Ser. Org. and Mgt.	5
NF	346L	Fd. Ser. Org. and Mgt. Lab	1
NF	450	Hotel Mgt.	4
		Prof. Elective	3

MT 332 Mk. Comm. Mgt.**.....5	MT 341 Buyer Behavior**.....5	NF 524 Prof. Internship in Inst. Fd. and Restaurant Mgt.....10
NF 446 Catering.....3	NF 504 Ad. Inst. Fd. and Restaurant Mgt.....2	
FS 577 Fd. Plant Sanitation.....4	CA 255 Textiles for Int.....3	
Prof. Electives.....7	CA 363 Envir. System/ Energy Mgt.....3	
	CA 398 Prof. Planning and Development.....1	
	Free Electives.....4	

TOTAL — 205 QUARTER HOURS

*HY 121-122-123 Tech. & Civil.; EH 260-261-262, Western World Literature; or AT 171-172-173, History of Art may be substituted for HY 101-102-103.

**A maximum of 51 credit hours, excluding EC 200, 202, and ACF 340, is allowed from the College of Business.

Nutrition and Foods

Major areas of concentration in Nutrition and Foods include dietetics, nutrition, and experimental foods with minors in food science, teaching, chemistry, biology, journalism, radio and television, and others from which a student may select.

Curriculum in Nutrition and Foods (NF)

FRESHMAN YEAR		
First Quarter		Third Quarter
MH 160 Pre-Cal. w/Trig.....5	CH 103 Fund. of Chem. I.....4	CH 104 Fund. of Chem. II.....4
BI 101 Prin. of Biology.....5	CH 103L Gen. Chem. Lab.....1	CH 104L Gen. Chem. Lab.....1
EH 101 English Comp.....3	EH 102 English Comp.....3	EH 103 English Comp.....3
HY 101 World History.....3	HY 102 World History.....3	HY 103 World History.....3
	NF 200 Nutr. & Health.....3	CA 116 Art for Living.....3
		FCD 157 Fam. & Hum. Dev.....3
SOPHOMORE YEAR		
CH 203 Organic Chem.....5	EC 200 Economics I*.....5	SC 111 Public Speaking.....5
NF 202 Prin. of Food Prep.....5	NF 204 Food Mgt. for the Consumer.....5	ZY 251 Physiology.....5
AEC 210 Microcomp. App. in Ag. or CSE 100 Pers. Comp. App.....3	ZY 250 Human Anatomy.....5	SY 201 Intr. to Soc.....5
Lit. Elective.....3	Elective.....3	CA 200 Mgt. for Cons.....4
JUNIOR YEAR		
NF 304 Quant. Food Prep.....5	PG 211 Psychology.....5	NF 392 Prin. of Normal Nutrition II.....5
NF 318 Nutri. Biochem.....5	NF 382 Prin. of Normal Nutrition I.....5	EHA 304 Tech. Writing or
MN 310 Prin. Mgt.....4	SY 220 Statistics.....5	JM 315 Tech. Journ.....3
NF 307 Surv. of Diet.....2	Prof. Elective*.....3	MB 300 Gen. Microbiol.....5
		Prof. Elective*.....5
SENIOR YEAR		
NF 564 Experimental Foods.....5	NF 362 Prob. in Comm. Nutr.....3	NF 502 Diet Therapy.....5
NF 592 Nutr. in Life Cy.....5	NF 346 Food Svc. Org. & Mgt. 5 Electives.....5	Prof. Electives*.....12
Prof. Electives*.....3	Liberal Ed. Elective.....5	
Elective.....5		

TOTAL — 205 QUARTER HOURS

*A maximum of 51 credit hours, excluding EC 200, 202, and AC 340, is allowed from College of Business.

Special areas of interest in Nutrition, Dietetics, Food Science, Communication in Food & Nutrition, Research, and Teacher Education may be developed through choice of elective courses.

American Dietetic Association Plan IV requirements for general dietetics will be met by the Nutrition and Foods curriculum.

Coordinated Dietetics Program

Upon completion of this program incorporating clinical experiences with classroom teaching, the student is eligible to take the examination to become a Registered Dietitian. This program is accredited by the American Dietetic Association.

Curriculum in the Coordinated Dietetics Program (CDP)

First Quarter			FRESHMAN YEAR			Third Quarter		
			Second Quarter					
MH	160	Pre-Cal. w/Trig.....5	CH	103	Fund of Chem. I.....4	CH	104	Fund. of Chem. I.....4
EH	101	English Comp.....3	CH	103L	Gen. Chem. Lab.....1	CH	104L	Gen. Chem. Lab.....1
HY	101	World History*.....3	EH	102	English Comp.....3	EH	103	English Comp.....3
FCD	157	Fam. & Hum. Dev.....3	NF	200	Nutr. & Health.....3	HY	103	World History*.....3
BI	101	Prin. of Biol. ....5	HY	102	World History*.....3	CA	116	Art for Liv. I.....3
			AEC	210	Micro Appl. in Ag. or	NF	202	Prin. of Food Prep. ....5
			CSE	100	Per. Comp. Appl.....3			
			SOPHOMORE YEAR					
CH	203	Organic Chem. ....5	ZY	250	Human Anatomy.....5	SY	201	Intr. to Soc. ....5
EC	200	Economics I.....5	NF	204	Food Mgt. for the	ZY	251	Physiology.....5
SY	220	Statistics.....5			Consumer.....5	CA	200	Mgt. for Cons. ....4
EH		Lit. Elective.....3	PG	211	Psychology.....5	MB	300	Gen. Microbiology ....5
					Lib. Ed. Elective.....5			
			JUNIOR YEAR					
NF	318	Nutr. Biochem.....5	NF	316	Food Svc: Plan.,	NF	432	Med. Dietetics.....10
MN	310	Prin. of Mgt. ....4			Prod., & Mgt. ....10	NF	392	Prin. of Normal
NF	307	Survey of Dietetics ....2	NF	382	Prin. of Normal			Nutrition II.....5
NF	564	Exp. Foods.....5			Nutrition I.....5			Elective.....2
					Elective.....3			
			SENIOR YEAR					
NF	442	Adv. Med. Dietetics ...10	NF	422	Comm. Nutrition.....10	NF	456	Admin. Dietetics.....12
NF	592	Nutr. in Life Cycle.....5	NF	346	Food Svc. Org. & Mgt. 5			

TOTAL — 205 QUARTER HOURS

*HY 121-122-123 Tech. & Civil.; EH 260-261-262, Western World Literature; or AT 171-172-173, History of Art may be substituted for HY 101-102-103.

Dual Objective Program with the College of Education

Dual objective programs with the College of Education are open to students registered in the School of Human Sciences in the following five majors:

Family and Child Development
Apparel and Textiles
Nutrition and Foods

Consumer and Family Economics
Interiors and Housing

Option in Cooperative Extension

Students enrolled in any of the majors in the School may prepare for a career in the Cooperative Extension Service through selection of certain courses as electives. Majors may fulfill the requirements of the Alabama Cooperative Extension Service through scheduling of the following courses:

NF 200, 202, 204, 324, 362
CA 140, 206, 222, 255 or 305, 470, 541
FCD 300
EM 200

Graduate Work

The School offers work leading to the Master of Science degree, Master of Arts in College Teaching degree, and Ph.D. degree in Family and Child Development and Nutrition, an interdepartmental program.

College of Liberal Arts

MARY P. RICHARDS, *Dean*
CAINE CAMPBELL, *Associate Dean*

IN THE COLLEGE OF LIBERAL ARTS a student can specialize in a particular field while also gaining a broad general education. Three academic areas — humanities, fine arts, and social sciences — are represented by the College's 15 departments — Art; Communication Disorders; English; Foreign Languages; Geography; History; Journalism; Music; Philosophy; Political Science; Psychology; Religion; Sociology, Anthropology, and Social Work; Speech Communication; and Theatre.

Besides specialization in majors, the curricula of this College lay a strong foundation for further studies in graduate school or professional school. The College also provides courses which are needed by students of all other instructional divisions of the University.

School of Fine Arts

Three of the departments — Art, Music, and Theatre — are administered through the College's School of Fine Arts. See entry later in this section.

Undergraduate Degrees

Four-year bachelor's degree programs are offered in three areas:

1. The *General Curriculum* offers options in 17 major fields, with a wide choice of minors available both within the College of Liberal Arts and in other colleges of the University.

2. *Special Curricula* are available in criminal justice, criminology, foreign languages-international trade, health administration, Latin American studies, pre-law, public administration, public relations, and Spanish and social work.

3. The *School of Fine Arts* offers programs in art, music, and theatre.

Embodied in these curricula are the requirements of the University-wide Liberal Education Program.

Graduate Degrees

Doctor of Philosophy degrees are offered in English, history, political science, and psychology. Master of Arts degrees are offered in English, French, Spanish, history, political science, sociology, and speech communication. Master of Science degrees are offered in communication disorders and psychology.

The designated degrees of Master of Communication Disorders, Master of French Studies, Master of Hispanic Studies, and Master of Public Administration are offered. The College's School of Fine Arts offers Master of Fine Arts and Master of Music degrees. The College participates in offering an interdisciplinary degree, Master of Arts in College Teaching. Degree programs are described in the *Graduate School Bulletin*.

Center for the Arts and Humanities

The Auburn University Center for the Arts and Humanities conducts history and heritage programs for the general public in localities throughout the state. For information, contact Dr. Leah Rawls Atkins, Director, in the Center's offices at Pebble Hill.

Social Science Research

Social science disciplines participate in sponsored research, interdisciplinary projects and the use of joint data banks and computer laboratory facilities. For information, contact Dr. Tom Martinson, Director of Social Science Research, Haley Center 2193.

Teacher Education Program

The College of Education offers a Fifth Year Program to Liberal Arts students holding a baccalaureate degree in economics, English, geography, history, music, political science,

psychology, sociology, or speech communication. Upon successful completion of the program, a master's degree in Education (M.Ed.) will be awarded and the graduate will be recommended for an A level teaching certificate (master's level certificate). The four-year Dual Objectives Program is available in these same disciplines.

Dual Degree Program in Engineering

This program provides for enrollment in the General Curriculum of the College of Liberal Arts for approximately three academic years and in the College of Engineering for approximately two academic years. Two degrees will be awarded: a bachelor of arts degree in the Liberal Arts major and a bachelor's degree in the designated Engineering field. See the *Liberal Arts Bulletin* for additional information.

Certificate in Aging Studies

The Certificate in Aging Studies is a multidisciplinary program designed for students interested in problems of aging persons which will give them a general competency in gerontology. The career-oriented option complements a student's major field of study and, upon completion of the 25 hours, leads to a Certificate in Aging Studies. The program is open to all students who choose to use their elective hours in this manner. Interested students should contact the Office of the Dean.

Russian and East-European Studies Program

A student enrolled in the General Curriculum and majoring in history (GHY), philosophy (GPA), or political science (GPO) may elect the Russian and East-European Studies Program. Upon completion of this program and earning a bachelor's degree, the achievement will be noted in the student's transcript. Consult the Chairman of the Committee on Russian/East-European and Asian Studies regarding this option.

Latin American Studies Program

The student desiring to pursue interdisciplinary studies in the Latin American area may enroll in the Special Curriculum in Latin American Studies. Required are a major in either history (LAH), Spanish (LAF), or political science (LAP), and concentrations in both remaining disciplines. Consult with departmental or the dean's advisers for more information.

Cooperative Education Programs

Cooperative Education Programs which give students an opportunity to integrate their academic training with work experience are offered in art, criminal justice, journalism, political science, pre-law, psychology, sociology, and speech communication. Students alternate each quarter between school and a work assignment provided through the Director of the Cooperative Education Program.

The University Honors Program

This program offers individual learning opportunities, the possibility of accelerated entry into a master's program, and participation in honors courses to entering freshmen with extraordinarily high academic aptitude.

Advisory Services for Students

The head of the department (or designee) in which the student majors becomes the student's adviser and is charged with outlining the student's major and minor work. The Office of the Dean, however, provides counseling services to the student before a major is declared. For pre-professional students, counseling on professional school admission tests, admissions requirements and other such matters is provided by special committees and advisers as listed in the *Liberal Arts Bulletin*.

The General Curriculum (GLA)

The General Curriculum of the College of Liberal Arts is designed to broaden the student intellectually through the humanities and the natural and social sciences. Seventeen majors are available under this curriculum.

FRESHMAN YEAR			
First Quarter		Second Quarter	Third Quarter
FL	Foreign Language* .....5	FL	Foreign Language* .....5
	Group Req. I .....3-5		Group Req. I .....3-5
EH	101 English Comp. ....3	EH	102 English Comp. ....3
HY	101 World History .....3	HY	102 World History .....3
	ROTC or Elective .....1		ROTC or Elective .....1
SOPHOMORE YEAR			
PO	209 American Govt. ....5	PO	210 State & Local Govt. ....5
GY	Geography** .....5		Elective .....3-5
	Group Req. II .....5		Group Req. II .....5
EH	Literature*** .....3	EH	Literature*** .....3
	ROTC or Elective .....1		ROTC or Elective .....1

*A foreign language through the first year sequence as a minimum.

**GY 102, World Geography, or a geography course approved by the department of the student's major.

***EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

JUNIOR AND SENIOR YEARS

During the junior and senior years the student is to complete his major requirements of at least 35 hours, two minors of at least 15 hours each (or a double minor of at least 30 hours), and elective work to total 201 hours. In lieu of two minors or a double minor, the student may declare a second major (from the list of possible majors shown below under Bachelor of Arts; Bachelor of Science;) or may declare two majors and also complete one or more minors. All major and minor courses are to be numbered 200 or above.

TOTAL — 201 QUARTER HOURS

GROUP REQUISITE I, Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

GROUP REQUISITE II, Science. A minimum of 10 hours in one science, including corresponding laboratories, from the following: BI 101-102, 101-103, 105-106, 105-107; CH 101-102-104, 103-104, CL 101-102, 110-103, PS 205-206-207, PS 220-221-222, or PHS 100-101.

GROUP REQUISITE III, Humanities-Social Sciences-Fine Arts. A course (3-5 hours) in art, economics (preferably 206), journalism (preferably 315), music, psychology, religion, speech communication, or theatre.

Majors and Minors in the General Curriculum

A student undecided about a major may delay declaring one until the end of the fifth quarter, but it is desirable to declare as soon as possible. Before a major is declared, the student will be in the General Curriculum (GLA). Students should consult with their departmental advisers regularly to plan their major work, clear prerequisites, and take their major courses according to departmental schedule. A minimum of 35 hours is required in each major. All courses must normally be numbered 200 or above.

BACHELOR OF ARTS: Anthropology, Art, Economics, English, Foreign Languages, Geography, History, Journalism, Philosophy, Political Science, Psychology, Religion, Social Work, Sociology, Speech Communication, and Theatre.

BACHELOR OF SCIENCE: Communication Disorders.

MINORS: Because the student's major will affect the choice of minors it is very important to consult with the major departmental adviser before selecting either two minors (minimum of 15 hours credit in each) or one double minor (minimum of 30 hours credit) from the following: anthropology, architecture, art, botany, chemistry, communication disorders, criminal justice, economics, English, foreign language, geography, geology, history, journalism, mathematics, music, philosophy, physical education, physics, political science, psychology, religion, sociology, speech communication, theatre, women's studies, zoology, and additional approved subjects in Agriculture, Business, Education, Engineering, or Human Sciences. Minor courses must normally be numbered 200 or above. Selected courses at the 100-level are, however, included in art, music and theatre; for requirements in these fields, the student should see an adviser. A student cannot major and minor in the same field (except in foreign language, see page 136.)

THE ANTHROPOLOGY MAJOR. Prerequisites: SY 201. The major will include ANT 203, SY 220, 370, ANT 303 or 403, plus an additional course in each of the four subdisciplines of anthropology: cultural, linguistic, archaeological and physical anthropology. With departmental permission a student may meet the distribution requirement with courses taught in other departments, but hours taken within the major must total 40.

THE ART MAJOR. Prerequisites: AT 111-112-113, 121-122-123 and 171-172-173. The major will include AT 231 or 232 or 233; 241 or 242 or 243; 251 or 252 or 253; and 9 hours of 300-level art history, plus 15 hours of art courses at the 200-level or above. (See also Curriculum in Visual Arts.)

THE COMMUNICATION DISORDERS MAJOR. The major will include audiology and speech pathology courses CD 340, 341, 350; the clinical sequence CD 455, 456; and the upper level courses CD 551, 552, 553, 554, 560, 561 and 562. Additional hours may be selected from related areas, upon approval of adviser.

THE ECONOMICS MAJOR. Prerequisites: EC 200 and 202. The major will include EC 551, 554, and 556; plus 20 hours of economics courses at the 300-level or above. EC 206 cannot count toward the major. (See also Curriculum in Economics in the College of Business.)

THE ENGLISH MAJOR. Prerequisites: EH 253-254-255 (or, if qualified, EH 250-251). All majors will take a course in Chaucer, Shakespeare, or Milton; a course in English literature; a course in American literature; and EH 400. Beyond this common core (20 hrs.), majors may elect, with adviser's approval, 20 hours of courses from Categories II through VI. These latter 20 hours may constitute a general English major, or a concentration in one of several differing areas of English. Interested students should contact the department for help in pursuing the various Major options.

THE FOREIGN LANGUAGE MAJOR. Prerequisites: 15 hours of first-year level course work in the chosen language. The major will include 35 hours of courses at the 200-level or above in the chosen language. Spanish majors will choose two courses from FL 431-432-433 and one course from FL 434-435. The student may have a major in one language and a single minor in one other. In this case, the student may count toward the bachelors degree, beyond the 80-hour limit, the number of hours received through advanced placement to a maximum of 15. See advanced placement. (See also Special Curriculum in Foreign Language — International Trade.)

THE GEOGRAPHY MAJOR. Prerequisites: GY 102, 214, 215, EHA 304, either SY 220 or MN 274. The major will include GY 400, 440, plus 20 or more hours of geography courses at the 300-level or above, including at least one regional geography course.

THE HISTORY MAJOR. Prerequisites: HY 101-102-103. The major will include either HY 201-202 or 207-208 and HY 405 plus at least 35 additional hours, at least 15 of which must be at the 500-level. The student should consult the History Department regarding completion of major and minor fields.

THE JOURNALISM MAJOR. Prerequisites: EH 101-102-103, JM 101. The major will include JM 221 (should be scheduled during the sophomore year), 222, 313, 314, 321, 322, 323, 421, 465, 485, and 422-423 or 425. A minimum of 48 hours is required for this major. (See also different journalism major in the Special Curriculum in Public Relations.)

THE PHILOSOPHY MAJOR. Prerequisites: PA 211 (or 370 in rare cases with approval), 202 or 214, and any other 200-level course, preferably 210. The major will include 333 (or 470 or 475 with approval); 334 (or 482, 484, or 590 with approval), 335 (or 380, 402, 432, 513, 580, or 591 with approval); plus 20 hours of philosophy courses at the 300-level or above, at least 15 of which should be 400-500-level. Prerequisites for the minor are 111, or 211 (or 370 in rare cases with approval); 202 or 214; and any other 200-level course; plus any 15 hours at or above the 300-level.

THE POLITICAL SCIENCE MAJOR. Prerequisites: MH 140 or 160 or 161; PO 209 and 210. The major requires 40 hours of political science in addition to PO 209 and 210. Its introductory series (15 hours) consists of PO 300, 302, and one course from PO 309, 312 or 325. Its advanced series consists of 15 hours (no fewer than 10 of which shall be lecture courses and no fewer than 5 of which shall be at the 500-level) in one of five fields — American Government, Comparative Politics, International Relations, Political Theory, and Public Administration — for which the introductory course has been taken (PO 209 and 210 are the introductory courses for American Government. PO 300 and 302 are the introductory courses for Political Theory.) Ten additional hours of political science electives shall be taken to complete the major. Ten hours of the 40 hours for the major must be at the 400 or 500-level. A 2.0 grade-point average is required for admission to the program. No grades below C are accepted for transfer credit for core course requirements. A 2.0 grade-point average for core course requirements is required for graduation.

THE PSYCHOLOGY MAJOR. The major will include PG 211, 314, 315, 320, and at least one other course of experimental psychology (PG 321, 322, 330), and four psychology courses

at the 400-500-level. A minimum of 41 hours is required for this major.

THE RELIGION MAJOR. Prerequisite: RL 201. The major requires 40 hours in religion courses including 301, and nine hours from RL 211, 212, 221, 222, and 230; 25 hours must be at the 300-level or above.

THE SOCIAL WORK MAJOR. Prerequisite: SY 201. The social work major will include SW 375, 376, SY 304 or 520, 220 and 370; followed by SW 320, 380, 506, 507, 508, 575, 420. The ten-hour natural science requirement will be met with BI 105-106. Group Requisite III will be completed with one economics course. Elective hours will be partially filled with PG 211, and one additional psychology course. Two fifteen hour minors are required. Formal application to the social work program is required prior to registration in SW 506, usually in the junior year. An information packet describing the program, options available, and admission procedure is available in Haley Center 6010. Graduation requires completion of all required Sociology and Social Work courses with a grade of C or better (See also Special Curricula in Spanish-Social Work, and Social Work-Child Welfare, and the Pre-Professional Curriculum in Pre-Law.)

THE SOCIOLOGY MAJOR. Prerequisites: SY 201. The major requires ANT 203, SY 220, 409 or 502, 370 or RSY 370 plus 20 additional hours, which may include an additional ANT course and additional courses in criminology. (See also special curriculum in criminology.) Sociology majors may minor in ANT or Social Work. Descriptive brochures are available in Departmental Office.

THE SPEECH COMMUNICATION MAJOR. The major will include: SC 230, 250, and 260; two courses selected from SC 340, 341, 370, and 311; plus an additional 25 hours selected from courses at the 400-level. Those wishing to emphasize mass communication will complete SC 230, 250, 260, 330, and 439; one production course (either SC 334, 336, or 337); one writing course (SC 335 or SC 338) plus an additional 20 hours from selected 400-level courses.

THE THEATRE MAJOR. The following core courses are required: TH 200, 201, 231, 240, 261, 265, 271, 321, 371-372-373-374. In addition, theatre majors are required to enroll in TH 100 and 300 during every quarter of residency. The balance of elective theatre hours should be selected in consultation with the student's theatre faculty adviser. A 2.0 grade-point average is required for retention in the program. A grade of C or better is required for all theatre courses. A grade of F in a theatre course excludes the student from major responsibilities in the production program for the following quarter. A minimum of 70 hours is required for the Theatre Major.

THE WOMEN'S STUDIES MINOR. A single minor, 15 hours, interdisciplinary. Students may choose from the following courses to complete this minor: ANT 313, 524, 550, EH 383, FCD 304, 568, FL 427, 501, 502, HY 325, PG 420, 444, SW 320.

Symbols for Majors

Majors	General Curriculum	Pre-Law
Undeclared	GLA	PL
Anthropology	GAN	
Art	GAT	
Communication Disorders	GCD	LCD
Criminal Justice		LCJ
Economics	GEC	LEC
English	GEH	LEH
Foreign Languages	GFL	LFL
Geography	GGY	LGY
History	GHY	LHY
Journalism	GJM	LJM
Philosophy	GPA	LPA
Political Science	GPO	LPO
Psychology	GPG	LPG
Religion	GRL	LRL
Social Work	GSW	LSW
Sociology	GSY	LSY
Speech Communication	GSC	LSC
Theatre	GTH	

Symbols for Special Curricula

Criminal Justice—Law Enforcement	CJL
Criminal Justice—Offender Rehab.	CJO
Criminal Justice—Youth Services	CJY
Criminal Justice and Spanish	CJF
Criminology	SCR
Foreign Language-International Trade	FLT
Health Administration	HA
Health Services	HSA
Health Systems	HSM
Latin American Studies—	
History	LAH
Political Science	LAP
Spanish	LAF
Music	MU
Public Relations—Journalism	PRJ
Public Relations-Speech Commun.	PRS
Public Administration	PUB
Social Work-Child Welfare	CSW
Spanish-Social Work	FSW
Theatre	TH
Visual Arts	VAT

Special Curricula

Special curricula leading to the Bachelor of Science degree include Criminal Justice, Criminology, Health Administration, Public Administration, and Social Work-Child Welfare. The Bachelor of Arts degree may be earned in the Special Curricula in Foreign Languages-International Trade, Public Relations, and Spanish and Social Work. A bachelor's degree may also be earned in the Pre-Law Curriculum.

Curriculum in Pre-Law (PL)

This curriculum, which is administered by the Department of Political Science, is designed to prepare students for accredited professional law schools, most of which require for admission a bachelor's degree, a good scholastic record, and a good score on the national Law School Admission Test (LSAT). The pre-law student should take the LSAT at least nine months ahead of the date he/she expects to enter law school.

FRESHMAN AND SOPHOMORE YEARS

The student will follow the General Curriculum and will take EC 200.

JUNIOR AND SENIOR YEARS

During the junior and senior years, the pre-law student will complete major requirements of at least 35 hours, two minors of at least 15 hours each, or a double minor of at least 30 hours, and additional work to total 201 hours. In lieu of two minors or a double minor, the student may declare a second major. He/she will take EC 202; EH 400; PG 211; AC 215; HY 306; HY 571 or 572; PO 501 or 502; and SC 111 or 140 in the major, minor, requisites, or electives. Recommended in addition to these are SC 370 and an additional course in political science, or PG 435.

TOTAL — 201 QUARTER HOURS

Majors in the Pre-Law Curriculum

BACHELOR OF SCIENCE: Communication Disorders.

BACHELOR OF ARTS: English, Criminal Justice, Economics, Foreign Language, Geography, History, Journalism, Philosophy, Political Science, Psychology, Religion, Sociology, Social Work, and Speech Communication. In addition to the foregoing majors from the General Curriculum, the following major is available in the Pre-Law curriculum:

THE CRIMINAL JUSTICE MAJOR. The major requires 35 hours including LE 260 in law enforcement courses. Also HHP 396 or PCS 265, PA 492, PG 301, PO 502, and SCR 302 which may be included in the student's minors. One of the two minor requirements will be in political science or criminology. (See also Special Curriculum in Criminal Justice-Law Enforcement/Offender Rehabilitation.) In the fall of 1990, a 2.0 grade-point average will be in effect for admission to the major. No grades below C to be accepted for transfer credit for core course requirements. A 2.0 grade-point average will be in effect for core course requirements for graduation.

A student, upon selection of a major, should check requirements and utilize Group Requisites I, II and III as much as possible to clear lower level requisites during the freshman and sophomore years.

Students may take no more than 25 percent of degree requirements in courses offered by the College of Business.

Criminal Justice

This curriculum prepares students for professional careers in criminal justice agencies at all levels of government. It offers two alternative specializations: *Law Enforcement*; or *Offender Rehabilitation* with options in either adult corrections or youth services.

The curriculum is administered by the Department of Political Science. This curriculum model does not show all the possible variations; students should consult the *Criminal Justice Adviser* before enrolling.

Requirements for admission to and graduation from the program: (1) Students on probation will not be accepted. (2) Effective Fall 1990, a 2.0 grade-point average required for admission. (3) No transfer grades below C accepted for core course requirements. (4) A 2.0 grade-point average in core courses required for graduation.

Curriculum in Criminal Justice (CJ)

FRESHMAN YEAR											
First Quarter				Second Quarter				Third Quarter			
Group Req. I.....3-5				Group Req. I.....3-5				Group Req. I.....3-5			
Group Req. II.....3-5				Group Req. II.....4-5				Group Req. III.....4-5			
EH	101	English Comp.....3	EH	102	English Comp.....3	EH	103	English Comp.....3			
HY	101	World History.....3	HY	102	World History.....3	HY	103	World History.....3			
ROTC or Elective.....1				ROTC or Elective.....1				ROTC or Elective.....1			
PE		Physical Education.....2	PE		Physical Education*.....2	PE		Physical Education*.....2			
SOPHOMORE YEAR											
AC	211/215/PA 492.....4-5	PO	210	State & Loc. Govt.....5	EC	200	Economics I.....5				
PO	209	American Govt.....5	SY	201	Intr. Sociology.....5	LE	260	Surv. of Law Enf.....5			
PG	211	Psychology.....5	Group Req. III.....3-5				SC	100 or 141.....3-5			
EH		Literature***.....3	EH		Literature***.....3	EH		Literature***.....3			
ROTC or Elective.....1				ROTC or Elective.....1				ROTC or Elective.....1			

*PE requisites: **Second Quarter.** PE 114C, 134, 132, 131 or 130. **Third Quarter.** MS/PE 105/162 or any swimming course.

**The student in *Youth Services Specialization* will substitute LE 335 or FCD 267.

***EH 253-254-255 or EH 260-261-262, EH 270-271-272 or EH 250-251.

JUNIOR AND SENIOR YEARS

Junior and senior years all students will complete EHA 307 or any other writing course; HHP 396/PCS 265; LE 262, 270, 335, 464; PG 301; SY 204 (except CJY students); SCR 302, 308; PO 502.

Students in the *Law Enforcement Specialization* will complete LE 261, 361, 363, 461/412; PO 323, 325, 501, 410/514/515 and SY 505. The student in both the *Offender Rehabilitation Specialization* and the *Youth Services Specialization* will complete CCP 521, SW 375 or 376 and three courses from SY 304, SCR 415, 420, 426, or SW 377.

The student in the *Youth Services Specialization* will complete FCD 267, 270, 302, 306, 310, and PO/SCR 415.

There are approved options for many of these required courses; students should consult with a *Liberal Arts Evaluator* or the *Criminal Justice Adviser* before registration.

TOTAL — 201 QUARTER HOURS

GROUP REQUISITE I. Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

GROUP REQUISITE II. A minimum of 10 hours in one science, including corresponding laboratories, from the following: BI 101-102, 101-103, 101-104, BI 101-108, 105-106, 105-107; CH 101-102-104 or 103-104 or 111-112-113, GL 101-102, 110-103, PS 205-206-207, 220-221-222, PHS 100-101.

GROUP REQUISITE III. A minimum of 9 hours in Ascent of Man series, art, foreign language, geography, literature, music, philosophy, religion, or theatre courses.

Criminal Justice and Spanish

This curriculum allows the student to combine preparation for professional practice of law enforcement and corrections with the development of a Spanish-speaking facility and knowledge of the cultural background of Spanish-speaking people. Given the substantial concentrations of Spanish-speaking people in many urban areas of the southern, western, and eastern United States and the relative lack of Spanish-speaking professionally trained criminal justices, the curriculum enhances the probability of employment in every area of law enforcement, youth services, correctional services, and the Federal Immigration and Naturalization, and Customs Services.

Students will be placed in a field internship of 9 hours in a criminal justice agency serving Spanish-speaking clients. Students enrolled in the curriculum will receive academic and professional guidance from the Criminal Justice Program, Department of Political Science, and the Department of Foreign Languages.

Requirements for admission to and graduation from this program: (1) Students on probation will not be accepted. (2) Effective Fall 1990, a 2.0 grade-point average required for admission. (3) No transfer grades below C accepted for core course requirements. (4) A 2.0 grade-point average required in core courses for graduation.

Curriculum in Criminal Justice and Spanish (CJF)

FRESHMAN YEAR

First Quarter			Second Quarter			Third Quarter		
FL	131	First Yr. Span. I.....5	FL	132	First Yr. Span. II.....5	FL	133	First Yr. Span. III.....5
EH	101	English Comp. ....3	EH	102	English Comp. ....3	EH	103	English Comp. ....3
		Group Requisite I ....3-5			Group Requisite I ....3-5			Group Requisite I ....3-5
HY	101	World History.....3	HY	102	World History.....3	HY	103	World History.....3
PE		Physical Education.....2	PE	114, 134, 132, 131, or 130.....2		MS/PE	105/162	or swimming.....2

SOPHOMORE YEAR

FL	231	Second Yr. Span. I.....5	FL	232	Second Yr. Span. II.....5	FL	233	Second Yr. Span. III.....5
PG	211	Psychology .....5	SY	201	Intr. Sociology .....5	PO	209	American Government 5
BI	105	Persp. in Biol. ....5	BI	106	Human Biol. ....5	EC	206	Socio-Economic Fnds. 3
EH	260	World Literature .....3	EH	261	World Literature .....3	EH	262	World Literature3

JUNIOR AND SENIOR YEARS

Junior Year: During the junior year the student will complete the following: EHA 307; FL 331, 340; GY 304; HHP 396 or PCS 265; LE 260, 270, 262 or 335; PO 210; SCR 302 or PG 301, SY 304 or 520.

Senior Year: During the senior year the student will complete the following: LE 363 or SCR 530, LE 461/412 or SCR 426, LE 464; PO 336 or 502; fifteen hours chosen from ANT 401, 511; FL 332, 434-435, 333-334-335; HY 300, 552, 554; PO 318, 539, 542; and electives to total 201 quarter hours.

TOTAL — 201 QUARTER HOURS

GROUP REQUISITE I. Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

Criminology

The curriculum in criminology represents a broad range of study and pre-professional preparation. The focus of study is upon the etiology of crime and society's reaction to it. The area more specifically emphasizes the sociology of law, research on crime and delinquency and theoretical developments in criminality and juvenile delinquency.

This curriculum prepares students for varied positions in governmental and private agencies which develop and implement programs related to law enforcement, court services, corrections, juvenile services and crime related research. The curriculum also provides the student with requisite skills for graduate study in the field of criminology or other related areas.

Curriculum in Criminology (SCR)

FRESHMAN YEAR

First Quarter			Second Quarter			Third Quarter		
		Group Requisite I ....3-5			Group Requisite I ....3-5			Group Requisite I ....3-5
		Group Requisite II ....4-5			Group Requisite II ....4-5	EH	103	English Comp. ....3
EH	101	English Comp. ....3	EH	102	English Comp. ....3	HY	103	World History.....3
HY	101	World History.....3	HY	102	World History.....3	SY	201	Intr. to Sociology.....5

SOPHOMORE YEAR

PO	209	American Govt. ....5	PO	210	State & Loc. Govt. ....5	PG	211	Intr. Psychology.....5
SY	204	Social Behavior.....5	ANT	203	Intr. Anthropology.....5	SCR	308	Juvenile Delinquency...5
		Group Requisite III ....4-5			Group Requisite III ....4-5	LE	260	Survey of Law
		Literature* .....3			Literature* .....3			Enforcement .....5
								Literature* .....3

*EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

JUNIOR AND SENIOR YEARS

Students in Criminology will complete SY 220, 370, 304 or 520, 409 or 502, 525 or 534; SCR 302, 415, 426, 450, 420 or 530; and PO 336 or 502, 332 or 501. The student may choose any minors but the following are recommended: Social Work (SW), Psychology (PG), Criminal Justice — Law Enforcement (LE), Political Science (PO), Anthropology (ANT) and, Spanish (FL).

TOTAL — 201 QUARTER HOURS

GROUP REQUISITE I. Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

GROUP REQUISITE II. A minimum of 10 hours in one science, including corresponding laboratories, from the following: BI 101-102, 101-103, BI 101-107, 105-106, 105-107; CH 101-102-104 or 103-104 or 111-112-113; GL 101-102, 110-103; PS 205-206-207, 220-221-222, PHS 100-101.

GROUP REQUISITE III. A minimum of 9 hours in art, foreign languages, geography, literature, music, philosophy, religion, or theatre courses.

Foreign Languages — International Trade

The curriculum enables students to combine foreign language studies in French, German, and Spanish with specifically selected business subjects, in order to open a broad variety of possible career opportunities. Such preparation also affords them the choice of graduate or other advanced study in either field, be it in universities or in specialized language or business institutes. This curriculum, especially if continued at the graduate level, can lead to government or teaching employment from federal and state service through university and junior college. Primary career application may be found with national or international firms engaged in foreign trade (within the United States or abroad), in the transportation and hotel industries, in international brokerage houses, and in a number of foreign trade management, public relations, and documentation/translation positions.

The following four-year program satisfies the requirements for graduation with a Bachelor of Arts degree in foreign languages (French, German, Spanish). See also Foreign Language Major and Minor under Majors and Minors in the General Curriculum.

Curriculum in Foreign Languages—International Trade (FLT)

First Quarter			FRESHMAN YEAR			Third Quarter		
			Second Quarter					
FL	First Yr. Lang. I	.....5	FL	First Yr. Lang. II	.....5	FL	First Yr. Lang. III	.....5
EH	101 English Comp.	.....3	EH	102 English Comp.	.....3	EH	103 English Comp.	.....3
HY	101 World History	.....3	HY	102 World History	.....3	HY	103 World History	.....3
MH	140 or 160 Algebra or		MH	161 or PA 111 Basic		SY	201 Intr. Sociology	.....5
	Alg./Trig.	.....5		Reasoning	.....3			
			SOPHOMORE YEAR					
FL	Sec. Yr. Lang. I	.....5	FL	Sec. Yr. Lang. II	.....5	FL	Sec. Yr. Lang. III	.....5
	Science*	.....5		Science*	.....5	PO	209 American Govt.	.....5
EC	200 Economics I	.....5	EC	202 Economics II	.....5	AC	211 Accounting I	.....4
EH	260 World Lit. I	.....3	EH	261 World Lit. II	.....3	EH	262 World Lit. III	.....3
			JUNIOR YEAR					
FL	Conversation	.....3	FL	Composition	.....3	FL	Civilization	.....3
PO	210 State & Local Govt.	.....5	MT	331 Prin. of Mktg.	.....5	MN	310 Prin. of Mgt.	.....4
AC	212 Accounting II	.....4	GY	302 Econ. Geog.	.....5	FI	361 Business Finance	.....5
EHA	315 B & P Rpt. Writing	.....3	MN	207 Data Processing	.....3		General Elective	.....5
			EHA	415 Written Bus. Comm.	.....3			
			SENIOR YEAR					
FL	Elective**	.....3	FL	Elective**	.....3	FL	420, 430, 450	.....3-4
	Intnl. Trade Elec.	.....5	FL	329-339-359	.....3	EC	571 Intern. Economics	.....5
	Intnl. Trade Elec.1	.....5		A & S Elective***	.....5		A & S Elective	.....5
	General Elective	.....3		General Elective	.....5		General Elective	.....3

*10 hours from the following approved electives: BI 101-102, 101-103, 105-106, 105-107; CH 101-102-104, 103-104, GL 101-102, 110-103, PS 205-206-207, PS 220-221-222, PHS 100-101.

**300-level or above elective.

***10 hours from the following approved electives: GY 102, 215, 303, 304, 305, 306, 307, 308, 350, 401, HY 300, 301, 355, 356, 527, 528, 529, 531, 532, 533, 537, 552, 553, 554, 555, PO 309, 311, 312, 314, 318, 526, 535, 539, 540, 542, RL 230, 301, SY 520, ANT 305, 511 or another foreign language.

†Students in FLT-Spanish are required to take EC 553.

Students may take no more than 25 percent of degree requirements in courses offered by the College of Business. This does not include the two courses in Economics, EC 200 and 202.

TOTAL — 201 QUARTER HOURS

Health Administration

This curriculum, leading to a Bachelor of Science degree, is designed to help prepare students for careers in such fields as hospital administration, health planning, nursing home administration, governmental health administration and other areas of health services administration. It is administered by the Department of Political Science. In addition to certain types of employment available immediately upon graduation from the undergraduate program, graduate training is available at other institutions through the Ph.D. level. Students interested in admission to such programs should maintain a **B** average, should take the appropriate Graduate Record Examination and should make application to the appropriate

professional school about a year in advance of the expected date of graduation. Students should consult their Health Administration adviser for information on opportunities for employment after graduation and requirements for admission to graduate study.

A 2.0 grade-point average is required for admission to the curriculum. No grades below C are accepted for transfer credit for core course requirements. A 2.0 grade-point average for core course requirements is required for graduation.

Curriculum in Health Administration (HA)

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
BI	105 Persp. in Biol. ....5	BI	106 Human Biology ....5	PO	209 American Govt. ....5
MH	160 Pre-Cal. w/Trig. ....5	MH	161 An. Geom. & Cal. ....5	PA	Group Req. I. ....3-5
EH	101 English Comp. ....3	EH	102 English Comp. ....3	EH	103 English Comp. ....3
HY	101 World History ....3	HY	102 World History ....3	HY	103 World History ....3

SOPHOMORE YEAR

	Group Req. II ....3-5	EC	200 Economics I ....5	EC	202 Economics II ....5
AC	211 Prin. of Acct. I ....4	AC	212 Prin. of Acct. II ....4	AC	213 Mgt. Cost & Budg. ....4
SY	201 Intr. Sociology ....5	SY	220 Statistics ....5	PO	325 Intr. Pub. Admin. ....5
EH	Literature* ....3	EH	Literature* ....3	EH	Literature* ....3

*EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

JUNIOR AND SENIOR YEARS

During the junior and senior years the student will complete the following special requirements: A) HA 360, HA 421, MN 207, PO 300, PO 326, PO 501 or 502, SY 577, and b) the requirements of either the HSA or HSM major.

THE HEALTH SERVICES ADMINISTRATION MAJOR (HSA). Students who select this major will take HA 420, 450, 451, 510 and one of the following — HA 530, HA 531, HA 539; in addition, they will take MN 307, PG 561, PO 333, 410, 517, and SC 304.

THE HEALTH SYSTEMS ADMINISTRATION MAJOR (HSM). Students who select this major will take HA 420, 450, 451, 510 and one of the following — HA 530, 531, 539; in addition, they will take AC 311, 312, 410, FI 361, PG 561, and PO 410.

Students in both majors are expected to consult regularly with their HA adviser for purposes of pre-registration and advance planning for course work, particularly their required administrative internship.

TOTAL — 207 QUARTER HOURS

GROUP REQUISITE I. PA 111 or a 200-level philosophy course.

GROUP REQUISITE II. EHA 315 or EH 400 or SC 111.

Public Administration

This curriculum, which is administered by the Department of Political Science, is designed to educate students for careers in the administration of governmental units. Students in this curriculum generally aspire to positions of leadership and responsibility in the public service. Much of the specialized course work of the junior and senior years focuses on (1) public administrative processes and (2) the place of public administration in the political system. Students should regularly consult their adviser for assistance in planning this course work.

Curriculum in Public Administration (PUB)

FRESHMAN YEAR

First Quarter		Second Quarter		Third Quarter	
PA	202 Ethics and Society ....5	PO	209 American Govt. ....5	PO	210 Am. State & Loc. Govt. ....5
	Group Req. I. ....4-5		Group Req. I. ....4-5		Group Req. I. ....4-5
EH	101 English Comp. ....3	EH	102 English Comp. ....3	EH	103 English Comp. ....3
HY	101 World History ....3	HY	102 World History ....3	HY	103 World History ....3
	Elective ....1		Elective ....1		Elective ....1

SOPHOMORE YEAR

EC	200 Economics I ....5	SY	201 Intr. Sociology ....5	EC	202 Economics II ....5
AC	211 Prin. of Accounting ....4	PO	302 Intr. Pol. Thought ....5	SY	202 Social Problems ....5
	Group Req. II ....3-5		Group Req. II ....3-5		Group Req. II ....3-5
EH	Literature* ....3	EH	Literature* ....3	EH	Literature* ....3
	Elective ....1		Elective ....1		Elective ....1

*EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

JUNIOR AND SENIOR YEARS

The student will complete the following: (a) PO 300, 323, 325, 326, 327, 328, 333, 501 or 502, 514, 515, 518, PG 211; (b) Group Requisite III; (c) at least 12 hours from the following: PO 320, 410, 450-451, 505, 517, 552; (d) Related courses requirement. At least 13 hours of course related to the student's curriculum and particular interests. See PUB adviser for possible course selections.

TOTAL — 201 QUARTER HOURS

A 2.0 grade-point average is required for admission to the curriculum. No grades below C are accepted for transfer credit for core course requirements. A 2.0 grade-point average for core course requirements is required for graduation. No more than 15 hours toward the PUB degree may be earned via internship and readings credit.

GROUP REQUISITE I. A minimum of 10 hours in one science, including corresponding laboratories, from the following: BI 105-106, 105-107; CH 101-102-104, 103-104, GL 101-102, 110-103, PS 205-206-207, 220-221-222, PHS 100-101.

GROUP REQUISITE II. The student will choose any three courses from the following: Mathematics, HY 201, 202, PA 210, GY 302, JM 315, SC 100, FL through the first two quarters of the first year sequence as a minimum.

GROUP REQUISITE III. The student will fulfill this tool skills requirement by completing the third quarter of a foreign language sequence, or a statistics, computer, or a governmental accounting course approved by the student's adviser.

Public Relations

The student in the Public Relations Curriculum will select a major in Journalism (PRJ) with a minor in Speech Communication or a major in Speech Communication (PRS) with a minor in Journalism and elective work to total 201 hours.

Curriculum in Public Relations (PRJ)

FRESHMAN YEAR			
First Quarter		Second Quarter	
FL	Foreign Language* .....5	FL	Foreign Language* .....5
	Group Req. I .....3-5		Group Req. I .....3-5
EH	101 English Comp. ....3	EH	102 English Comp. ....3
HY	101 World History .....3	HY	102 World History .....3
	ROTC or Elective .....1		ROTC or Elective .....1
		Third Quarter	
		FL	Foreign Language* .....5
			Group Req. I .....3-5
		EH	103 English Comp. ....3
		HY	103 World History .....3
		JM	101 Newspaper Style .....3
			ROTC or Elective .....1
SOPHOMORE YEAR			
PO	209 American Govt. ....5	PO	210 State & Loc. Govt. ....5
	Major Course .....3-5		Major Course .....3-5
	Group Req. II .....5		Group Req. II .....5
EH	Literature*** .....3	EH	Literature*** .....3
	ROTC or Elective .....1		ROTC or Elective .....1
		SY	201 Intr. Sociology .....5
			Major Course .....3-5
			Intr. Pub. Rel.** .....5
		EH	Literature*** .....3
			ROTC or Elective .....1

*A foreign language through the first year sequence as a minimum.

**Either JM 304 or SC 304 may be taken depending upon the student's major.

***EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

GROUP REQUISITE I. Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

GROUP REQUISITE II. A minimum of 10 hours in one science, including corresponding laboratories, from the following: BI 101-102, 101-103, 105-106, 105-107; CH 101-102-104 or 103-104 or 111-112-113; GL 101-102, 110-103; PS 205-206-207, 220-221-222, PHS 100-101.

MAJOR

The major in Public Relations/Journalism will consist of all of the following:

JM	221 Beginning News Writing .....5	JM	421 Photo-Journalism .....5
JM	222 Newspaper Lab .....1	JM	465 History & Prin. of Journ. ....5
JM	313 Reporting .....5	JM	485 Advanced Reporting .....3
JM	314 Copyreading & Editing .....3	JM	422-423 Workshop in Journalism .....3-3
JM	321 Newspaper Makeup & Layout .....5		or
JM	322 Feature Writing .....5	JM	425 Journalism Internship .....6
JM	323 The Community Newspaper .....5		

The student will take at least 20 hours from the following courses:

MT 241 Business Law	4	PG 431 Social Psychology	5
MT 331 Prin. of Marketing	5	PO 341 Pressure Groups	3
MT 332 Market Comm. Mgt.	5	PO 342 Politics & the Media	5
MT 341 Consumer Analysis	5	EHA 304 Technical Writing	3
SY 204 Social Behavior	5	EHA 315 B & P Report Writing	3
SY 507 Pub. Opinion and Propaganda	5	EH 400 Advanced Composition	5
PG 211 Psychology	5	EHA 415 Written Business Comm.	3
EC 200 Economics I	5	EHA 416 App. Writ. & Editing	3
EC 202 Economics II	5		

MINOR

The minor in Speech Communication will consist of three of the following:

SC 250 Foun. of Human Comm.	5	SC 336 Tel. Production-Direction I	5
SC 111 Public Speaking	5	SC 338 Broadcast News Writing	5

Electives to total 201 quarter hours.

TOTAL — 201 QUARTER HOURS

Curriculum in Public Relations (PRS)

FRESHMAN YEAR			
First Quarter		Second Quarter	
FL Foreign Language*	5	FL Foreign Language*	5
Group Req. I	3-5	Group Req. I	3-5
EH 101 English Comp.	3	EH 102 English Comp.	3
HY 101 World History or		HY 102 World History or	
HY 204 Hist. of Tech.	3	HY 205 Hist. of Tech.	3
ROTC or Elective	1	ROTC or Elective	1
SOPHOMORE YEAR			
PO 209 American Govt.	5	PO 210 State & Loc. Govt.	5
Major Course	3-5	Major Course	3-5
Group Req. II	5	Group Req. II	5
EH Literature***	3	EH Literature***	3
ROTC or Elective	1	ROTC or Elective	1
SY 201 Intr. Sociology	5	SY 201 Intr. Sociology	5
Major Course	3-5	Major Course	3-5
Intr. Pub. Rel.**	5	Intr. Pub. Rel.**	5
Literature***	3	Literature***	3
ROTC or Elective	1	ROTC or Elective	1

*A foreign language through the first year sequence as a minimum.

**Either JM 304 or SC 304 may be taken depending upon the student's major.

***EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

GROUP REQUISITE I. Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

GROUP REQUISITE II. A minimum of 10 hours in one science, including corresponding laboratories, from the following: BI 101-102, 101-103, 105-106, 105-107; CH 101-102-104 or 103-104 or 111-112-113; GL 101-102, 110-103; PS 205-206-207, 220-221-222. PHS 100-101.

MAJOR

The major in Public Relations/Speech will consist of all of the following:

SC 230 Fdtns. Mass Comm.	5	And three of the following:	
SC 250 Fdtns. Human Comm.	5	SC 334 Radio Prod.	5
SC 260 Fdtns. Rhetoric & Soc. Influence	5	or	
SC 304 Intr. to Public Relations	5	SC 337 Electronic Fld. Prod.	5
SC 311 Persuasive Discourse	5	or	
SC 330 Elements of Prod.	5	SC 336 TV Prod.	5
SC 402 PR Campaigns	5	SC 338 Broadcast News Writing	5
SC 404 Case Studies in PR	5	or	
SC 408 PR Writing & Research	5	SC 335 Writg. for TV/Radio/Film	5
SC 439 Internship	3 or 6	SC 433 Media Law & Reg.	5
		SC 451 Surv. Res. Meth.	5

The student will take 14 hours from the following: MT 255, 331, 332, 341; PO 342. For MT 332 and 341, see University Bulletin for prerequisites.

MINOR

The minor in Journalism will consist of three of the following:

JM 221 Beginning News Writing	5	JM 321 Newspaper Makeup and Layout	5
JM 313 Reporting	5	JM 322 Feature Writing	5
JM 314 Copyreading & Editing	3		

Electives to total 201 quarter hours.

TOTAL — 201 QUARTER HOURS

Social Work—Child Welfare

This curriculum allows the student to combine preparation for general professional Social Work practice with development of additional knowledge about family functioning and child welfare practice. Students will be placed in a field internship of 15 hours in a social service agency serving families and/or children. Graduates will earn a Bachelor of Science degree.

Curriculum in Social Work—Child Welfare (CSW)

FRESHMAN YEAR		
First Quarter		Third Quarter
BI 105 Perspectives in Biol. ....5	BI 106 Human Biol. ....5	SY 301 Sociol. of Family .....5
EH 101 English Comp. ....3	EH 102 English Comp. ....3	EH 103 English Comp. ....3
GY 102 World Geography .....5	SY 201 Intr. Sociology .....5	SW 375 Intr. Social Welfare .....5
Group Requisite I .....5	Group Requisite I .....5	SC 141 Group Discussion .....5
SOPHOMORE YEAR		
EH 260 Lit. of Western World* 3	EH 261 Lit. of Western World...3	EH 262 Lit. of Western World...3
Group Requisite II...3-5	Group Requisite II...3-5	Grp. Requisite II or
SW 376 Community Soc. ....5	PO 210 Am. St. & Local ....5	Elec. ....3
Services .....5	Govt. ....5	EC Economics .....3
PO 209 American Govt. ....5	SW 380 Fnds. Social Work .....5	SY 220 Statistics .....5
		Group Requisite III .....4
JUNIOR YEAR		
HY 315 Am. Black History .....5	PG Psychology .....5	SY 304 Minorities** .....5
Group Requisite III .....4	Group Requisite III .....4	SW 506 Methods I .....5
PG 211 Psychology .....5	Group Requisite IV .....5	SW 320 Practicum .....4
	Elective .....3	
SENIOR YEAR		
SY 370 Methods Social Res. ....5	SW 377 Child Wel. Practice .....5	SW 420 Field Placement .....15
SW 507 Methods II .....5	SW 508 Methods III .....3	
Elective .....3	SW 575 Social Policy .....5	
Group Requisite III .....4	Group Requisite III .....4	

*Students using World History or Technology and Civilization in the Group Requisite II may substitute EH 253-254-255 or 270-271-272 or 250-251.

**Or SY 520 Race Relations if not elected under Group IV.

TOTAL — 200 QUARTER HOURS

GROUP REQUISITE I, Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

GROUP REQUISITE II, History. The student may elect the world history sequence, HY 101-102-103 or the American History sequence, HY 201-202 or the Technology and Civilization sequence, HY 121-122-123.

GROUP REQUISITE III, Family and Child Development. Select 20 hours from the following: FCD 280, 301, 302, 306, 308, 347, 420, 467.

GROUP REQUISITE IV, Social Sciences. Select one course from the following: PG 350, 536, SC 481, SY 520.

Spanish and Social Work

This curriculum allows the student to combine preparation for professional practice of Social Work with the development of a Spanish-speaking facility and knowledge of the cultural background of Spanish-speaking people. Given the substantial concentrations of Spanish-speaking people in many urban areas of southern, western, and eastern United States and the relative lack of Spanish-speaking professionally trained social workers, the curriculum enhances the probability of employment in every area of social services, family and child services, mental health services, employment training and placement services, correctional services, and services for the aged.

Students will be placed in a field internship of 15 hours in a social service agency serving Spanish-speaking clients. Students enrolled in the curriculum will receive academic and professional guidance from the Department of Foreign Languages and the Social Work Program, Department of Sociology and Anthropology.

Curriculum in Spanish and Social Work (FSW)

FRESHMAN YEAR

First Quarter			Second Quarter			Third Quarter		
FL	131	1st Year Spanish I.....5	FL	132	1st Year Spanish II.....5	FL	133	1st Year Spanish III.....5
		Group Req. I.....3-5			Group Req. I.....3-5			Group Req. I.....3-5
EH	101	English Composition.....3	EH	102	English Composition.....3	EH	103	English Composition.....3
HY	101	World History.....3	HY	102	World History.....3	HY	103	World History.....3

SOPHOMORE YEAR

FL	231	2nd Year Spanish I.....5	FL	232	2nd Year Spanish II.....5	FL	233	2nd Year Spanish III.....5
PG	211	Psychology.....5	SY	201	Intr. Sociology.....5			Elective*.....5
BI	105	Persp. in Biol.....5	BI	106	Human Biol.....5	EC		Economics.....3-5
EH	260	Literature.....3	EH	261	Literature.....3	EH	262	Literature.....3

GROUP REQUISITE I. Mathematics-Philosophy. One philosophy course (3-5) or one mathematics course (5). Any Auburn University philosophy course or comparable transfer credit in philosophy will fulfill the requirement. Any mathematics or philosophy courses which are requisites to the student's major program will apply in fulfillment of this Group Requisite as well. Group Requisite I may be completed in one quarter.

JUNIOR AND SENIOR YEARS

During the junior year the student will complete the following:

SW	375	Intr. Social Welfare.....5	PO	209	American Govt.....5
SW	376	Community Social Services.....5	GY	304	Latin America.....5
SW	380	Foundations of Social Work.....5	PG		Psychology.....5
SY	220	Statistics.....5	SW	320	Practicum.....4
SY	370	Methods of Social Res.....5			

During the senior year the student will complete the following:

SY	304	Minority Groups or.....5	FIFTEEN HOURS CHOSEN FROM THE FOLLOWING:		
SY	520	Rac. & Ethnic Relations.....5	ANT	401	Kinship, Marriage & Fam.....5
SW	506	Social Work Methods I.....5	ANT	511	Language and Culture.....5
SW	507	Social Work Methods II.....5	FL	331	Spanish Conv.....3-5
SW	508	Social Work Methods III.....3	FL	332	Spanish Comp.....3-5
SW	575	Social Work Policy.....5	FL	336-337	Spanish Civil.....3-10
SW	420	Social Work Field Place.....15	FL	434-435	Spanish Am. Lit.....3-6
PO	210	State & Local Govt.....5	FL	333-334-335	Spanish Amer. Civil.....3-9
		Elective*.....3-5	HY	300	Contemp. Central American History.....3
		Elective*.....3-5	HY	552	Central America and the Caribbean.....5
		Elective*.....3-5	HY	554	History of Mexico.....5
		Elective*.....3-5	PO	318	Latin America & United Sts.....3
		Elective*.....3-5	PO	539	Govt. & Pols. Latin America.....5

*Elective to total 200 quarter hours.

TOTAL — 200 QUARTER HOURS

School of Fine Arts

Department of Art

The Visual Arts curriculum prepares students to become graphic designers, illustrators, advertising artists, art directors, painters, sculptors, and printmakers. It leads to the Bachelor of Fine Arts degree. Its programs of studio courses are combined with study of the historical and cultural background of the visual arts. Courses in general education promote an understanding of the artist's roles and responsibilities in society. A structured program of fundamentals and intermediate courses precedes advanced courses in which students work independently with the guidance of instructors.

The Visual Arts curriculum may be divided into three general categories: academic courses, studio courses and courses in art history. Studio courses are divided into three progressive group levels. The first year is made up of visual art fundamentals. The second and third years contain classes in basic traditional media in which the student learns technical procedures and develops the disciplines necessary to self expression in the third and fourth year areas of concentration. The third and fourth year areas include drawing, painting, printmaking, sculpture, visual design and illustration.

The Visual Communications program gives fundamental training in the techniques of graphic design and related areas of visual communication. It is strongly reinforced with courses in painting, drawing, printmaking, sculpture and art history. Students preparing

themselves as practicing artists or artist-teachers may concentrate entirely upon the offerings in the traditional fine arts media. Students planning to teach at the college level need to secure a Master of Fine Arts degree at this or another institution.

The department also offers a limited number of courses for education majors specializing in art, and for students in other fields who seek general knowledge and appreciation of the visual arts. Students in the General Curriculum of the College of Liberal Arts may elect a minor (15 hours), a double minor (30 hours), or B.A. with art major.

The Department of Art is an accredited member of the National Association of Schools of Art and Design, and a member of the College Art Association.

Transfer

All course work to be considered for transfer credit should be the equivalent of work required in the Visual Arts curriculum at Auburn. Art studio course credit earned (C or better) will be considered for advanced standing if a complete portfolio of work is submitted to the Auburn Art Department for evaluation. If the examples do not approximate Auburn's requirements, then credit may be given for an art studio elective. If the quality of work is not acceptable, credit may be given for an open elective. **Transfer students are advised that their degrees may require more than a total of four years because of the professional nature of Auburn's curriculum, the sequential arrangement of its courses, and heavy demands for enrollment.**

Graduate Study in Fine Arts

Students who hold the degree of Bachelor of Fine Arts, or a similar degree, are eligible to apply to the Dean of the Graduate School for admission to the graduate program leading to the Master of Fine Arts degree. For details examine the *Graduate School Bulletin*.

Curriculum in Visual Arts (VAT)

FIRST YEAR											
First Quarter			Second Quarter		Third Quarter						
AT	111	Fundamentals.....	5	AT	112	Fundamentals.....	5	AT	113	Fundamentals.....	5
AT	121	Fundamentals.....	5	AT	122	Fundamentals.....	5	AT	123	Fundamentals.....	5
AT	171	Hist. of World Art.....	3	AT	172	Hist. of World Art.....	3	AT	173	Hist. of World Art.....	3
EH	101	English Comp.....	3	EH	102	English Comp.....	3	EH	103	English Comp.....	3
SECOND YEAR											
AT	211	Basic Fig. Dwg.....	5	AT	212	Fig. Const.....	5	AT	213	Fig. Drawing.....	5
AT		Group A Studio.....	5	AT		Group A Studio.....	5	AT		Group A Studio.....	5
		Natural Science.....	5			Social Science.....	5			Natural Science.....	5
		Math/Philosophy.....	3			Math/Philosophy.....	3	AT		Art History.....	3
THIRD YEAR											
AT		Group A Studio.....	5	AT		Group A Studio.....	5	AT		Group B Studio.....	5
AT		Group A Studio.....	5	AT		Group A or B Studio.....	5	AT		Group A or B Studio.....	5
		Natural Science.....	5			Nat. or Soc. Sci.....	5			Nat. or Soc. Sci.....	5
AT		Art History.....	3	AT		Art History.....	3			Elective.....	3
FOURTH YEAR											
AT		Group B Studio.....	5	AT		Group B Studio.....	5	AT	499	Senior Project.....	5
AT		Group A or B Studio.....	5	AT		Group A or B Studio.....	5	AT		Studio or AT HY.....	5
AT		Studio or AT HY.....	5	AT		Studio or AT HY.....	5	AT		Studio or AT HY.....	5
		Elective.....	3			Elective.....	3			Elective.....	3

TOTAL — 210 QUARTER HOURS

Six hours of Basic and six hours of Advanced ROTC may be scheduled in lieu of 12 hours of general electives.

GROUP A STUDIO

Prerequisites: AT 113, 123, 171, 172, and 173 (or by special permission).

Figure Drawing		Visual Communications	
AT 211 Basic Figure Drawing	AT 221 Graphic Processes	AT 321 Photodesign	
AT 212 Figure Construction	AT 222 Design Systems	AT 322 Photocommunication	
AT 213 Figure Drawing	AT 223 Graphic Formats	AT 323 Typographics	

Painting	
AT	231-331 Oil Painting
AT	232-332 Transp. Wtr. Color
AT	233-333 Opaque Wtr. Color

Printmaking	
AT	241-341 Relief Printmaking
AT	242-342 Intaglio Printmaking
AT	243-343 Planographic Printmaking

Sculpture	
AT	251-351 Clay Sculpture
AT	252-352 Wood Sculpture
AT	253-353 Stone Sculpture

GROUP B STUDIO

Prerequisites: 18 hours of art history and the minimum averages listed below.

AT	424-425-426	Visual Design 1, 2, 3	2.0	Average in 200-level Drawing and Visual Comm.
AT	434-435-436	Advanced Painting/Drawing 1, 2, 3	2.0	Average in 200-level Drawing and Painting.
AT	444-445-446	Advanced Printmaking 1, 2, 3	2.0	Average in 200-level Drawing and Printmaking.
AT	454-455-456	Advanced Sculpture 1, 2, 3	2.0	Average in 200-level Drawing and Sculpture.
AT	464-465-466	Illustration 1, 2, 3	2.0	Average in 200-level Drawing and Visual Comm.

Department of Music

The Department of Music provides instruction and performing experience to students interested in developing their talents in music. The courses of study provided by the Department have been created to present a balance between creative skills and academic studies, allowing at the same time a certain flexibility to meet individual requirements.

The Department of Music offers the Music major a professional curriculum leading to the Bachelor of Music degree, with majors (a) Performance, (b) Theory and Composition, (c) Church Music, (d) Piano Pedagogy, or (e) Jazz. These programs provide preparation for the professional field of performance and for private or college teaching of applied music, theory, and composition. They also provide training for church organists and choir directors.

Students pursuing the Bachelor of Music Education degree will register through the College of Education.

For the student wishing to major in Music History and Literature, the Department of Music offers a program of studies leading to the Bachelor of Arts degree. This is a cultural, not a professional, degree.

All music majors and minors must perform an entrance audition and take a placement examination in music theory. Non majors will be asked to audition for placement in private instruction. Certain performing groups will require auditions as well.

Private instruction is available to all University students in band and orchestral instruments, voice, piano, and organ. Performance groups, such as the Marching and Concert Bands, Orchestra, University Singers, Concert Choir, Women's Chorus and Men's Chorus, Opera Workshop, and various instrumental ensembles, are also available to students in all curricula.

In each curriculum option six hours of Basic and six hours of Advanced ROTC may be scheduled in lieu of 12 hours of general electives.

Music Performance Major (MU)

First Quarter			FIRST YEAR			Third Quarter		
			Second Quarter					
MU	131	Mat. & Org. Music	MU	132	Mat. & Org. Music	MU	133	Mat. & Org. Music
EH	101	English Comp.	EH	102	English Comp.	EH	103	English Comp.
HY	101	World History	HY	102	World History	HY	103	World History
MU	181	Performance (major)	MU	181	Performance (major)	MU	181	Performance (major)
MU	187	Performance (minor)	MU	187	Performance (minor)	MU	187	Performance (minor)
MU	100	Perform. Attn'dce	MU	100	Perform. Attn'dce	MU	100	Perform. Attn'dce
MU	251	Mu. Lit.	MU	252	Mu. Lit.	MU	253	Mu. Lit.
			SECOND YEAR					
MU	231	Mat. & Org. Music	MU	232	Mat. & Org. Music	MU	233	Mat. & Org. Music
		Natural Science			Natural Science	MH	100	Mathematics
MU	181	Performance (major)	MU	181	Performance (major)	MU	181	Performance (major)
MU	187	Performance (minor)	MU	187	Performance (minor)	MU	187	Performance (minor)
MU	100	Perform. Attn'dce	MU	100	Perform. Attn'dce	MU	100	Perform. Attn'dce
MU	251	Mu. Lit.	MU	252	Mu. Lit.	MU	253	Mu. Lit.
MU	231	Mat. & Org. Music	MU	232	Mat. & Org. Music	MU	233	Mat. & Org. Music
		Natural Science			Natural Science	MH	100	Mathematics
MU	181	Performance (major)	MU	181	Performance (major)	MU	181	Performance (major)
MU	187	Performance (minor)	MU	187	Performance (minor)	MU	187	Performance (minor)
MU	100	Perform. Attn'dce	MU	100	Perform. Attn'dce	MU	100	Perform. Attn'dce
MU	251	Mu. Lit.	MU	252	Mu. Lit.	MU	253	Mu. Lit.

THIRD YEAR

MU 331 Mat. & Org. Music	5	MU 332 Mat. & Org. Music	5	MU 333 Mat. & Org. Music	5
MU 361 Conducting	2	PA 210 Philosophy	3	PA 214 Philosophy	3
MU 351 Music History	3	MU 352 Music History	3	MU 353 Music History	3
MU 381 Performance (major)	3	MU 381 Performance (major)	3	MU 381 Performance (major)	3
MU Ensemble	1	MU Ensemble	1	MU 100 Perform. Attndce.	0
MU 100 Perform. Attndce.	0	MU 100 Perform. Attndce.	0	Elective	3
Elective	3	Elective	3		

FOURTH YEAR

FL Foreign Language	5	FL Foreign Language	5	FL Foreign Language	5
MU 381 Performance (major)	3	MU 381 Performance (major)	3	MU 381 Performance (major)	3
MU 452 Voc. Lit. or		MU Pedagogy	3	MU Ensemble	1
MU 454 Instrmtl Lit.	3	MU Ensemble	1	MU 363 Conducting	2
MU Ensemble	1	MU 362 Conducting	2	MU 100 Perform. Attndce.	0
MU 100 Perform. Attndce.	0	MU 100 Perform. Attndce.	0	Elective	3
Elective	6	Elective	3		

TOTAL — 206 QUARTER HOURS

*In lieu of this elective, Vocal Performance majors are to take FL 391 Lyric Diction.

Music Theory and Composition Major (MU)

First Quarter

MU 131 Mat. & Org. Music	5
EH 101 English Comp.	3
HY 101 World History	3
MU 184 Performance	1
MUT 116 Woodwind Instr.	1
MUT 110 String Instr.	1
MU 100 Perform. Attndce.	0
MU 251 Mu. Lit.	1

FIRST YEAR

Second Quarter

MU 132 Mat. & Org. Music	5
EH 102 English Comp.	3
HY 102 World History	3
MU 184 Performance	1
MUT 117 Woodwind Instr.	1
MUT 111 String Instr.	1
MU Perf. Group	1
MU 100 Perform. Attndce.	0
MU 252 Mu. Lit.	1

Third Quarter

MU 133 Mat. & Org. Music	5
EH 103 English Comp.	3
HY 103 World History	3
MU 184 Performance	1
MUT 118 Woodwind Instr.	1
MUT 112 String Instr.	1
MU Perf. Group	1
MU 100 Perform. Attndce.	0
Elective	3
MU 253 Mu. Lit.	1

SECOND YEAR

MU 231 Mat. & Org. Music	5	MU 232 Mat. & Org. Music	5
Natural Science	5	Social Science	3
MU 184 Performance	1	PG 212 Psychology	5
MUT 113 Brass Instr.	1	MU 184 Performance	1
MU 107 Voice Class	1	MUT 114 Brass Instr.	1
Social Science Elect.	3	MU 108 Voice Class	1
MU Perf. Group	1	MU Perf. Group	1
MU Ensemble	1	MU Ensemble	1
MU 100 Perform. Attndce.	0	MU 100 Perform. Attndce.	0

THIRD YEAR

MU 331 Mat. & Org. Music	5	MU 332 Mat. & Org. Music	5	MU 333 Mat. & Org. Music	5
MU 351 Music History	3	MU 352 Music History	3	MU 353 Music History	3
MU 337 Modern Harmony I	3	MU 338 Modern Harm. II	3	MU 339 Modern Harm. III	3
MU 384 Performance	1	MU 384 Performance	1	MU 384 Performance	1
MU Perf. Group	1	MU Perf. Group	1	MU Perf. Group	1
MU 100 Perform. Attndce.	0	MU 100 Perform. Attndce.	0	MU 100 Perform. Attndce.	0
Elective	3	Elective	3	Elective	3
MU 334 Mu. Comp.	1	MU 335 Mu. Comp.	1	MU 336 Mu. Comp.	1

FOURTH YEAR

FL Foreign Language	5	FL Foreign Language	5	FL Foreign Language	5
MU 434 Music Comp.	3	MU 435 Music Comp.	3	MU 436 Music Comp.	3
MU 384 Performance	1	MU 384 Performance	1	MU 384 Performance	1
MU 537 Orchestration	3	MU 445 Theory Pedagogy	3	MU Perf. Group	1
MU Perf. Group	1	MU 538 Orchestration	3	MU 100 Perform. Attndce.	0
MU 100 Perform. Attndce.	0	MU Perf. Group	1	Elective	6
Elective	6	MU 100 Perform. Attndce.	0	MU 539 Orchestration	3
		Elective	3		

TOTAL — 209 QUARTER HOURS

Church Music Major (MU)

FIRST YEAR			THIRD YEAR					
First Quarter			Second Quarter			Third Quarter		
MU	131	Mat. & Org. Music .....5	MU	132	Mat. & Org. Music .....5	MU	133	Mat. & Org. Music .....5
EH	101	English Comp. ....3	EH	102	English Comp. ....3	EH	103	English Comp. ....3
HY	101	World History .....3	HY	102	World History .....3	HY	103	World History .....3
MU	181	Performance (major)....3	MU	181	Performance (major)....3	MU	181	Performance (major)....3
MU	187	Performance (minor)....1	MU	187	Performance (minor)....1	MU	187	Performance (minor)....1
MU		Ensemble .....1	MU		Ensemble .....1	MU		Ensemble .....1
MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0
MU	251	Mu. Lit. ....1	MU	252	Mu. Lit. ....1	MU	253	Mu. Lit. ....1
SECOND YEAR			THIRD YEAR			THIRD YEAR		
Natural Science .....5			Natural Science .....5			MH 100 Mathematics .....5		
MU	231	Mat. & Org. Music .....5	MU	232	Mat. & Org. Music .....5	MU	233	Mat. & Org. Music .....5
MU	181	Performance (major)....3	MU	181	Performance (major)....3	MU	181	Performance (major)....3
MU	187	Performance (minor)....1	MU	187	Performance (minor)....1	MU	187	Performance (minor)....1
MU		Ensemble .....1	MU		Ensemble .....1	MU		Ensemble .....1
		(or MU 211).....1			(or MU 212).....1	MU	100	Perform. Attndce. ....0
MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0			Elective.....3
		Elective.....3			Elective.....3			
FOURTH YEAR			THIRD YEAR			THIRD YEAR		
Foreign Language .....5			Foreign Language .....5			MU 333 Mat. & Org. Music .....5		
PA	210	Philosophy .....3	PA	214	Philosophy .....3	MU	353	Music History .....3
MU	351	Music History .....3	MU	352	Music History .....3	MU	381	Performance (major)....3
MU	381	Performance (major)....3	MU	381	Performance (major)....3	MU		Ensemble .....1
MU	312	Hymnology .....3	MU	311	Liturgies .....3	MU	100	Perform. Attndce. ....0
MU		Ensemble .....1	MU		Ensemble .....1			Elective.....6
MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0			
FOURTH YEAR			FOURTH YEAR			FOURTH YEAR		
Foreign Language .....5			Foreign Language .....5			FL Foreign Language .....5		
MU	361	Conducting .....2	MU	415	Organ Lit. or	MU	416	Church Music
MU	381	Performance (major)....3			Vocal Pedagogy .....3			Seminar .....3
MU		Ensemble .....1	MU	381	Performance (major)....3	MU	381	Performance (major)....3
MU	100	Perform. Attndce. ....0	MU	362	Conducting .....2	MU	453	Choral Lit. ....3
		Elective.....6	MU		Ensemble .....1	MU		Ensemble .....1
			MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0
					Elective.....5			

TOTAL — 210 QUARTER HOURS

Piano Pedagogy Major (MU)

FIRST YEAR											
First Quarter				Second Quarter				Third Quarter			
EH	101	English Comp.	3	EH	102	English Comp.	3	EH	103	English Comp.	3
HY	101	World History	3	HY	102	World History	3	HY	103	World History	3
MU	131	Mat. & Org. Music	5	MU	132	Mat. & Org. Music	5	MU	133	Mat. & Org. Music	5
MU	184	Performance (major)	1	MU	184	Performance (major)	1	MU	184	Performance (major)	1
MU	187	Performance (minor)	1	MU	187	Performance (minor)	1	MU	187	Performance (minor)	1
MU	100	Perform. Attndce.	0	MU	100	Perform. Attndce.	0	MU	100	Perform. Attndce.	0
		Music Elective	1			Music Elective	1			Music Elective	1
MU	251	Surv. Music Lit.	1	MU	252	Surv. Music Lit.	1	MU	253	Surv. Music Lit.	1
MU	327	Piano Ensemble	1	MU	327	Piano Ensemble	1	MU	327	Piano Ensemble	1
SECOND YEAR											
MU	231	Mat. & Org. Music	5	MU	232	Mat. & Org. Music	5	MU	233	Mat. & Org. Music	5
MU	181	Applied Piano	3	MU	181	Applied Piano	3			Math/Philosophy	5
MU	187	Applied Minor	1	MU	187	Applied Minor	1	MU	181	Applied Piano	3
		Natural Science	5			Natural Science	5	MU	187	Applied Minor	1
MU	327	Piano Ensemble	1	MU	327	Piano Ensemble	1	MU	327	Piano Ensemble	1
MU	100	Convocation	0	MU	100	Convocation	0	MU	100	Convocation	0
		Elective	1			Elective	1			Elective	1

MU	331	Mat. & Org. Music	..5
MU	351	Music History	..3
MU	381	Applied Piano	..3
MU	324A	Piano Accomp.	..1
MU	457	Keyboard Lit.	..1
CTM	304	Mu. & Rel. Arts	..5
MU	100	Convocation	..0

THIRD YEAR			
MU	332	Mat. & Org. Music	..5
MU	352	Music History	..3
MU	381	Applied Piano	..3
MU	325A	Piano Accomp.	..1
MU	458	Keyboard Lit.	..1
CTM	596	Cur. Trends in Ear.	..5
		Child. & Elem. Mu.	..5
MU	100	Convocation	..0

MU	333	Mat. & Org. Music	..5
MU	353	Music History	..3
MU	361	Conducting	..2
MU	381	Applied Piano	..3
MU	326A	Piano Accomp.	..1
MU	459	Keyboard Lit.	..1
FED	300	Ed. Psych.	..5
MU	100	Convocation	..0

FL		Foreign Language	..5
MU	447	Piano Pedagogy	..3
MU	424A	Piano Accomp.	..1
MU	381	Applied Piano	..3
MU	337	Modern Harmony	..3
MU	471	Piano Skills and	..3
		Team Teaching	..2
MU	100	Convocation	..0

FOURTH YEAR			
FL		Foreign Language	..5
MU	448	Piano Pedagogy	..3
MU	425A	Piano Accomp.	..1
MU	381	Applied Piano	..3
MU	472	Piano Skills and	..3
		Team Teaching	..2
		Elective	..3
MU	100	Convocation	..0

FL		Foreign Language	..5
MU	449	Piano Pedagogy	..3
MU	426A	Piano Accomp.	..1
MU	381	Applied Piano	..3
MU	473	Piano Skills and	..3
		Team Teaching	..2
		Elective	..3
MU	100	Convocation	..0

TOTAL — 205 QUARTER HOURS

Jazz Major (MU)

FIRST YEAR

First Quarter

MU	131	Mat. & Org. of Music	..5
EH	101	English Comp.	..3
HY	101	World History	..3
MU	184	Performance	..1
MU	116	Woodwind Instr.	..1
MU	100	Perform. Attendance	..0
MU	251	Music Lit.	..1
MU		Perform. Group	..1

Second Quarter

MU	132	Mat. & Org. of Music	..5
EH	102	English Comp.	..3
HY	102	World History	..3
MU	184	Performance	..1
MU	117	Woodwind Instr.	..1
MU	100	Perform. Attendance	..0
MU	252	Music Lit.	..1
MU		Perform. Group	..1

Third Quarter

MU	133	Mat. & Org. of Music	..5
EH	103	English Comp.	..3
HY	103	World History	..3
MU	184	Performance	..1
MU	118	Woodwind Instr.	..1
MU	100	Perform. Attendance	..0
MU	253	Music Lit.	..1
MU		Perform. Group	..1

SOPHOMORE YEAR

MU	231	Mat. & Org. of Music	..5
		Natural Science	..5
MU	184	Performance	..1
MU	113	Brass Instr.	..1
MU	107	Voice Class	..1
MU		Perform. Group	..1
MU	200	Jazz Piano	..1
MU	100	Perform. Attendance	..0
		Soc. Sci. Elective	..3

MU	232	Mat. & Org. of Music	..5
		Natural Science	..5
MU	184	Performance	..1
		Soc./Nat. Sci. Elective	..3
MU	114	Brass Instr.	..1
MU	200	Jazz Piano	..1
MU	100	Perform. Attendance	..0
MU	108	Voice Class	..1
MU		Perform. Group	..1

MU	233	Mat. & Org. of Music	..5
		Math. or Philosophy	..5
MU	184	Performance	..1
MU	115	Brass Instr.	..1
MU	119	Perc. Instr.	..1
MU		Perform. Group	..1
MU	200	Jazz Piano	..1
MU	100	Perform. Attendance	..0
MU		Elective	..3

JUNIOR YEAR

MU	331	Mat. & Org. of Music	..5
MU	351	Music History	..3
MU	341	Jazz Theory	..3
MU	384	Performance	..1
MU		Perform. Group	..1
MU	100	Perform. Attendance	..0
MU	344	Jazz Rep.	..3
MU	334	Music Comp.	..1

MU	332	Mat. & Org. of Music	..5
MU	352	Music History	..3
MU	342	Jazz Theory	..3
MU	384	Performance	..1
MU		Perform. Group	..1
MU	100	Perform. Attendance	..0
MU	345	Jazz Rep.	..3
MU	335	Music Comp.	..1

MU	333	Mat. & Org. of Music	..5
MU	353	Music History	..3
MU	343	Jazz Theory	..3
MU	384	Performance	..1
MU		Perform. Group	..1
MU	100	Perform. Attendance	..0
MU	346	Jazz Rep.	..3
MU	336	Music Comp.	..1

SENIOR YEAR

FL		Foreign Language	..5
MU	437	Jazz Improvisation	..3
MU	384	Performance	..1
MU	461	Anal. of Jazz	..3
		Master Works	..3
MU		Perform. Group	..1
MU	100	Perform. Attendance	..0
		Elective	..3
		Elective	..3

FL		Foreign Language	..5
MU	438	Jazz Improvisation	..3
MU	384	Performance	..1
MU	372	Hist. of Jazz	..3
MU	462	Jazz Comp. & Arr.	..3
MU		Perform. Group	..1
MU	100	Perform. Attendance	..0
		Elective	..3

FL		Foreign Language	..5
MU	439	Jazz Improvisation	..3
MU	384	Performance	..1
MU	463	Jazz Comp. & Arr.	..3
MU		Perform. Group	..1
MU	100	Perform. Attendance	..0
		Elective	..6

TOTAL—207 QUARTER HOURS

Music — Bachelor of Arts (MU)

FIRST YEAR			THIRD YEAR					
First Quarter			Second Quarter					
MU	131	Mat. & Org. Music .....5	MU	132	Mat. & Org. Music .....5	MU	133	Mat. & Org. Music .....5
EH	101	English Comp. ....3	EH	102	English Comp. ....3	MH	100	Mathematics .....5
HY	101	World History .....3	HY	102	World History .....3	EH	103	English Comp. ....3
MU	184	Performance .....1	PA	211	Philosophy .....3	HY	103	World History .....3
MU		Ensemble .....1	MU	184	Performance .....1	MU	184	Performance .....1
		Elective .....3	MU		Ensemble .....1	MU		Ensemble .....1
MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0
SECOND YEAR			SECOND YEAR					
MU	231	Mat. & Org. Music .....5	MU	232	Mat. & Org. Music .....5	MU	233	Mat. & Org. Music .....5
		Natural Science .....5			Natural Science .....5	EH	255	English Lit. ....3
EH	253	English Lit. ....3	EH	254	English Lit. ....3	MU	184	Performance .....1
MU	184	Performance .....1	MU	184	Performance .....1	MU		Ensemble .....1
MU		Ensemble .....1	MU		Ensemble .....1	AT	171	Art History .....3
MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0
MU	251	Surv. Mu. Lit. ....1	MU	252	Surv. Mu. Lit. ....1			Elective .....5
THIRD YEAR			THIRD YEAR					
MU	331	Mat. & Org. Music .....5	MU	332	Mat. & Org. Music .....5	MU	333	Mat. & Org. Music .....5
MU	351	Music History .....3	MU	352	Music History .....3	MU	353	Music History .....3
MU	384	Performance .....1	MU	384	Performance .....1	MU	384	Performance .....1
PA	212	Philosophy .....3	MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0
MU	100	Perform. Attndce. ....0			Academic Minor .....5			Academic Minor .....5
		Academic Minor* .....5			Elective (Social or Nat. Science) .....3			Elective (Social or Nat. Science) .....3
FOURTH YEAR			FOURTH YEAR					
PG	211	Psychology .....5	FL		Foreign Language .....5	FL		Foreign Language .....5
MU	384	Performance .....1	MU	361	Conducting .....2	MU	384	Performance .....1
FL		Foreign Language .....5	MU	384	Performance .....1	MU	100	Perform. Attndce. ....0
MU	100	Perform. Attndce. ....0	MU	100	Perform. Attndce. ....0			Academic Minor .....5
		Academic Minor .....5			Academic Minor .....5			Elective (Social or Nat. Science) .....3
		Elective (Social or Nat. Science) .....3			Elective (Social or Nat. Science)3			

TOTAL — 199 QUARTER HOURS

*A minor of 30 quarter hours elected from approved courses.

Keyboard proficiency is required for non-keyboard majors. In such cases three of the applied music credits will be taken in piano.

Supplementary Requirements for Bachelor of Music and Bachelor of Arts Degree Candidates

1. All Music Majors, Music Education Majors and Music Minors taking MU 100 are to attend 80% (or 9, whichever is less) of the concerts and Wednesday afternoon convocations on the approved list compiled by the departmental office. This is on a pass/fail basis. The list of approved concert offerings is to be prepared by the departmental office each quarter and distributed to all students at the first convocation. A signed program is to be collected by a person designated by the departmental office. These are to be recorded by office personnel along with convocation attendance. Students must complete the appropriate number of quarters of convocation to clear graduation. Absences may be excused only by the Head of the Music Department.

2. At the end of the Sophomore year a comprehensive examination will be given which must be passed before the student is admitted to the upper division music courses. Transfer students must complete this examination to receive junior standing.

3. A. Students electing the performance major will present a junior recital during the third year of study and a senior recital during the fourth year of study.

B. Students electing the Theory and Composition major will present an original composition in small form during the third year of study and an original composition in large form during the fourth year of study.

C. Students electing the History and Literature major will present a written thesis during the fourth year of study.

D. Students electing the Church Music major will present a senior recital during the fourth year of study. The major performance area must be in organ or voice; if one is an organ major, his minor must be voice; if one is a voice major, an organ minor is required unless his keyboard background is too weak, in which case the minor must be piano.

E. Students electing the Piano Pedagogy major will present a senior recital during the fourth year of study.

4. Credit in private instruction is based on the amount of practice, each credit hour requiring a minimum of five hours practice per week.

5. Students whose major performing medium is not piano or organ will elect piano as the minor instrument.

6. Participation in an approved music performing group is required each quarter, with or without credit. Participation in opera workshop is required of junior and senior voice majors.

7. All students taking private instruction will meet public performance requirements as designated by the faculty. (See Music Department special regulations regarding requirements for jury examinations and convocation performances.)

Music Education

Teacher Education: Admission to the Teacher Education Program of the College of Education is open to students registered in the School of Fine Arts to the same extent that it is open to students registered in the College of Education. Upon completion of all requirements of both the Teacher Education Program and the professional curriculum in music, the Dean of the College of Education will recommend to the appropriate State Department of Education that a professional certificate be issued. It is considered desirable for students who wish to engage in junior high or high school teaching to identify this objective as soon as possible in their four-year undergraduate work. Such students will be advised by two advisers, a professional education adviser in the College of Education and an academic adviser in the Department of Music. The advisers will counsel in their respective areas.

Graduate Work in Music

Admission to graduate work toward the Master of Music Degree requires a Bachelor's degree in music, music education, or the equivalent from this or another recognized institution. Admission to graduate study in the Music Department shall be in accordance with policies of the Graduate School. In addition, all candidates must take entrance examinations in music theory and history administered by members of a Departmental Screening Committee, demonstrate competency at the keyboard, and fulfill additional requirements as follows:

Instrumental Majors — Audition

Voice Majors — Audition and demonstration of satisfactory diction in Italian, French, and German.

Music Organizations

Several musical organizations, sponsored by the University and directed by the Department of Music, provide excellent training in group music. See section on musical groups in the student handbook, *Tiger Cub*. These activities, which are open to students of the University, may be taken with or without credit.

Department of Theatre

The Department of Theatre provides instruction and production experience to students interested in developing their talents in the theatrical arts, whether as majors or non-majors. To permit students to explore their personal resources in theatre, a broad range of classroom, laboratory, and performance experiences is provided in acting, directing, scenic and lighting design, costume design, theatre technology, construction and crafts, theatre history, dramatic literature, theatre criticism, and theatre administration and management.

The Bachelor of Fine Arts degree is specifically for those students of outstanding talent who enter college with a firm idea of their professional goals or who discover them soon after entering undergraduate study. This major (TH) is for students seeking professional training and/or desiring an intensive program of theatre studies with a high degree of specialization in one of two areas of concentration; i.e., Theatre Performance or Theatre Production. Admission to the program involves an audition or presentation of portfolio with continued quarterly review. Final recommendation for graduation is made after the successful presentation of a recital and/or portfolio during the candidate's final year.

The Bachelor of Arts degree is designed for students seeking the broadest possible exposure in the study of theatre and drama within the liberal arts curriculum. It is for students who choose to emphasize theatre as a humanistic study and/or who wish to concentrate in theatre history/criticism and dramatic literature, performance or production. The specific requirements for the major (GTH) in this program may be found in this *Bulletin* on page 137.

A curriculum in theatre/business management through the General Business-Theatre Professional Option, an interdepartmental program between the Departments of Management and Theatre, is administered by the College of Business. This major (GBT) is for students who wish to pursue a career in professional theatre business management.

Theatre Performance Major (TH)

FIRST YEAR		
First Quarter		
TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4
TH 201 Intr. to the Theatre ...3	TH 200 Intr. Act. & Direct ...4	TH 261 Costume Construction ...4
TH 231 Theatre Technology I ...4	TH 265 Stage Makeup ...3	EH 103 English Comp. ...3
EH 101 English Comp. ...3	EH 102 English Comp. ...3	HY 103 World History ...3
HY 101 World History ...3	HY 102 World History ...3	HY Philosophy or Math ...5
Elective ...1	Elective ...1	Elective ...1
Second Quarter		
TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Lab. ...1-4
TH 211 Voice for the Actor I ...2	TH 212 Acting I Fund. ...4	TH 271 Play Analysis ...4
TH 240 Theatrical Design ...4	Natural Science ...5	TH 214 Stage Movement ...3
Natural Science ...5	Theatre Electives ...4	Natural or Soc. Sci. ...5
Electives ...4	Electives ...5	TH 371 History of Theatre I ...3
THIRD YEAR		
TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Lab. ...1-4	TH 300 Theatre Lab. ...1-4
TH 321 Directing I ...4	TH 311 Voice for the Actor II ...2	TH 373 History of Theatre III ...3
TH 372 History of Theatre II ...3	Natural or Soc. Sci. ...5	Natural or Soc. Sci. ...5
Natural or Soc. Sci. ...5	Electives ...8	TH 312 Acting II Charac. ...4
Electives ...5		Electives ...5
FOURTH YEAR		
TH 100 Theatre Convoc. ...0	TH 100 Theatre Convoc. ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Lab. ...1-4	TH 300 Theatre Lab. ...1-4	TH 300 Theatre Laboratory ...1-4
TH 413 Acting Auditions ...1	Theatre Electives ...5	Theatre Electives ...9
Theatre Electives ...3	Electives ...6	Electives ...6
Electives ...5	TH 412 Acting III	
TH 374 History of Theatre IV ...3	Scene Study ...4	
TH 411 Voice for Actor III ...3		

TOTAL — 206 QUARTER HOURS**Theatre — Production Major**

FIRST YEAR		
First Quarter		
TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4
TH 201 Intr. to Theatre ...3	TH 200 Intr. to Act. & Dir. ...4	TH 261 Costume Construction ...4
TH 231 Theatre Technology I ...4	TH 232 Theatre Technology II ...4	EH 103 English Comp. ...3
EH 101 English Comp. ...3	EH 102 English Comp. ...3	AT 173 Art History III ...3
AT 171 Art History I ...3	AT 172 Art History II ...3	PA 202 Ethics & Society ...5
Elective ...1	Elective ...1	
Second Quarter		
TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4
TH 240 Theatrical Design ...4	TH 232 Drafting ...4	TH 271 Play Analysis ...4
TH 345 Rendering ...4	TH 362 Costume History II ...4	TH 371 History of Theatre I ...3
TH 361 Costume History I ...4	PHS 101 Intr. to Phys. Sc. ...5	TH 365 Costume Design I ...4
PHS 100 Intr. to Phys. Sc. ...5	TH 351 Lighting Design ...4	ANT 203 Intr. to Anthropology ...5
THIRD YEAR		
TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4
TH 240 Theatrical Design ...4	TH 232 Drafting ...4	TH 271 Play Analysis ...4
TH 345 Rendering ...4	TH 362 Costume History II ...4	TH 371 History of Theatre I ...3
TH 361 Costume History I ...4	PHS 101 Intr. to Phys. Sc. ...5	TH 365 Costume Design I ...4
PHS 100 Intr. to Phys. Sc. ...5	TH 351 Lighting Design ...4	ANT 203 Intr. to Anthropology ...5

THIRD YEAR

TH 300 Theatre Laboratory ...1-4	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 333 Scene Painting .....4	TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory .....1
TH 366 Costume Design II.....4	TH 265 Stage Makeup .....3	TH 342 Property Design .....3
TH 372 History of Theatre II ....3	TH 341 Scene Design I .....4	TH 373 History of Theatre III ...3
Electives .....6	Natural or Soc. Sci. ....5	TH 363 Adv. Cost. Const. I .....4
	Theatre Elective .....4	Elective4

FOURTH YEAR

TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0	TH 100 Theatre Convocation ...0
TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4	TH 300 Theatre Laboratory ...1-4
TH 321 Directing I .....4	TH 441 History of Design .....4	TH 331 Adv. Theatre
TH 461 Adv. Cost. Const. II .....4	Electives .....12	Technology .....4
Natural or Soc. Sci. ....5		Natural or Soc. Sci. ....5
TH 374 History of Theatre IV ...3		Electives .....8

TOTAL — 206 QUARTER HOURS



School of Nursing

EDETH K. KITCHENS, *Dean*

THE SCHOOL OF NURSING, established in 1979, offers a program of preparation leading to the degree of Bachelor of Science in Nursing.

The nursing curriculum is designed to prepare the beginning professional nurse as a generalist ready to assume responsibility as a member of the health-care team in providing care for individuals and groups. The program is planned to provide an educational base which allows for advancement in formal study, research, and practice. The facilities and resources of the University are utilized to provide a broad academic background in the humanities and sciences. Graduates are eligible to take the State Board Test Pool examination to become registered nurses.

A pre-professional program in Nursing Science is required of all students seeking admission to the professional curriculum. The first two years of course work are designated as Pre-Nursing (NS). The Professional Program (NUR) requires seven quarters of course work, laboratory and clinical experience.

Curriculum in Pre-Nursing Science (NS)

LEVEL I		
First Quarter		
EH	101 English Comp.	3
HY	101 World History	3
BI	101 Prin. of Biology	5
MH	140 College Algebra or	
MH	160 Pre. Cal. w/Trig.	5
NUR	101 Orientation	1
Second Quarter		
EH	102 English Comp.	3
HY	102 World History	3
PG	211 Psychology	5
CH	101 Intr. Chem. I*	2
SY	201 Intr. to Soc.	5
Third Quarter		
EH	103 English Comp.	3
HY	103 World History	3
CH	102 Intr. Chem. II*	2
CH	103L Gen. Chem. Lab*	1
	Physical Educ.	2
	Elective**	5
LEVEL II		
ZY	250 Human Anatomy	5
CH	104 Fund. of Chem. II	4
CH	104L Fund. of Chem. Lab	1
PG	212 Dev. Psychology or	
FCD	330 Lifespan Hum. Dev.	5
ZY	251 Physiology	5
CH	203 Organic Chem.	5
FED	270 Statistics	3
CCP	223 Hum. Rel. for	
	Hlth. Prof.	2
MB	300 Gen. Microbiol. or	
MB	302 Med. Microbiol.	5
NF	372 Nutrition	3
NUR	201 Cmptr. Appli. to Nur.	2
	Elective**	5

TOTAL — 96 QUARTER HOURS

Curriculum in Professional Nursing (NUR)

LEVEL III		
NUR	301 Found. of Nur.	10
NUR	303 Hlth. Assess.	4
ZY	440 Clinical Phys. I.	4
NUR	311 Nursing Concepts I	12
ZY	441 Clinical Phys. II	4
ZY	442 Clinical Phys. Lab.	1
NUR	312 Nursing Concepts II	12
NUR	315 Family Stressors	4
Fourth Quarter		
NUR	321 Nur. of Child-Bearing Family	9
NUR	331 Child Hlth. Nurs.	9
LEVEL IV		
NUR	422 Comm. Hlth. Nur.	7
NUR	412 Psychiatric/Mental Hlth. Nur.	7
NUR	432 Nurs. Res.	4
NUR	443 Geront. Nur.	4
NUR	450 Senior Seminar	3
NUR	460 Special Topics in Clinical Nursing	7
	Elective	3
NUR	495 Mgmt. in Nur.	5
NUR	499 Preceptorship	13

TOTAL — 218 QUARTER HOURS***

*Students should take CH 101 unless they have had high school chemistry and scored at least 25 on the ACT or 1130 on the SAT. See adviser for study plan taking CH 103.

**Electives may be chosen from any field.

***Required for graduation.

Admission

Freshman eligibility is determined by the University Admissions Office. Admission requirements are stated elsewhere in the *Bulletin*. High school preparatory courses in math (Algebra I and II and Plane Geometry) are required for admission to the pre-nursing curriculum. Students who do not have these courses will be admitted to the General Studies curriculum until a preparatory mathematics course is taken. High school chemistry and biology courses are strongly recommended, along with other college preparatory courses in social science, history, literature and English composition.

Transfers from other institutions must apply through the University Admissions Office. Review of transcripts by the School of Nursing will determine the amount of credit allowed for the pre-nursing requirements. Students planning to transfer are encouraged to contact the School of Nursing as soon as possible for advisement concerning transferability of credits. An overall grade average of at least 2.0 is required of students desiring to transfer into the School of Nursing from another curriculum on campus.

Registered nurses: The School of Nursing offers advanced placement for R.N. students pursuing the B.S.N. degree. Registered nurse students must complete the pre-nursing curriculum required of all nursing majors. Advanced placement within the third and fourth levels is determined by standardized testing. The School of Nursing should be contacted for further advisement.

Professional Program: Pre-nursing students must formally apply in February to the School of Nursing. Applicants are notified by April 15 of acceptance or non-acceptance. If the number of qualified applicants exceeds the spaces available, a waiting list will be established for the Fall Quarter of that academic year only. Admission to the professional program is open annually in the Fall Quarter. Due to limited enrollment, all students who meet minimal criteria may not be admitted.

Criteria for consideration for admission include a minimal grade average of 2.5, completion of the pre-nursing requirements, references, and a completed application. The Admissions Committee considers, in addition to the above criteria, general conduct, health, and extra-curricular activities. An interview may be required by the School of Nursing.

Academic Regulations

An adviser from the faculty or staff is assigned to each student majoring in nursing. Academic program planning is done with the advisers. Students should consult with their advisers each quarter.

Advanced placement or CLEP credit in pre-nursing courses is granted in the humanities, English, and math according to University policies stated elsewhere in the *Bulletin*. No advanced standing is allowed in the natural sciences by the School of Nursing. Proficiency examinations or Advanced Placement (CEEB), with accepted score, may be used for advanced placement.

An overall grade average of 2.0 must be maintained for progression through the professional program. Pre-nursing students who do not attain an overall grade average of at least 2.0 at the beginning of the second year should consider alternative fields of study. A minimum grade average of 2.5 is required for consideration for admission to the professional program.

A minimal grade of **C** is required in most pre-nursing courses. Transfer credit will not be granted for courses in which a grade less than **C** is earned.

In the professional program of the School of Nursing, a minimal grade of **C** must be achieved in all courses except electives. If a grade less than **C** is received, the student may repeat the course one time only. Students who do not satisfactorily complete a major clinical course and whose GPA falls below a 2.0 will be dropped from the professional program and must reapply. Transfer credit is not generally allowed for courses in the Professional Program.

The Professional Program

Facilities

The School of Nursing is housed in Miller Hall, where classrooms, an auditorium, a skills laboratory, a learning resource and computer center, and faculty offices are located.

Facilities for clinical nursing experiences include East Alabama Medical Center and other hospitals in the area, Lee County Mental Health Center, clinics, nursing homes, physicians' offices, Lee County Public Health Department, public schools and industrial sites.

Note: Students are responsible for complying with policies and procedures required by agencies in which clinical work is done.

Expenses

Additional expenses will be incurred by students accepted into the professional program. Uniforms, equipment, transportation to clinical sites, a health examination, and liability and health insurance coverage are among the requirements. Detailed information is furnished by the Dean's Office at the time of admission.

Accreditation

The School of Nursing has received full approval of the Alabama Board of Nursing, and is accredited by the National League for Nursing.



School of Pharmacy

WILLIAM H. CAMPBELL, *Dean*
CHARLES M. DARLING, *Associate Dean*

THE SCHOOL OF PHARMACY offers two professional degrees and a graduate degree. The professional degrees are a fully accredited program leading to a Bachelor of Science in Pharmacy and a Doctor of Pharmacy program leading to a Pharm.D. The graduate degree, a Master of Science, is described in the Graduate School Bulletin.

The Bachelor of Science Curriculum requires three years in the professional school after completion of two years in the pre-professional program. The Doctor of Pharmacy program requires one continuous year of course work beyond the baccalaureate program.

The undergraduate degree in pharmacy is a necessary requisite for licensure for the practice of pharmacy in each of the 50 states and also the territories of the United States. In addition, completion of the program prepares students for careers in those areas of pharmacy not requiring licensure.

Pharmacists provide those personal health services that assure safety and efficacy in the procuring, storing, prescribing, compounding, dispensing, delivering, administering, and use of drugs and related articles. Among these services are maintenance of patient medication profiles, monitoring of drug therapy, counseling patients in matters of health, and providing health and drug information for nurses, physicians, and other health care practitioners.

Opportunities for graduates exist in community pharmacy, institutional pharmacy, industrial pharmacy (research, product development, analytical control, product manufacture, sales, and distribution), wholesale pharmacy, public health, health care funding agencies, and regulatory agencies. In addition, there are opportunities in research and teaching in an academic environment.

Admission

The course requirements for admission to the School of Pharmacy may be satisfied by completion of the six-quarter pre-pharmacy curriculum as outlined in the Pre-Professional Curricula in the College of Sciences and Mathematics. Any or all of these requirements may be met by transfer of credit from other institutions. Transfer students from junior colleges may receive no more than 102 quarter hours credit for the pre-pharmacy curriculum.

Admission is limited and is contingent upon available facilities and faculty. To be considered for admission the applicant must have a satisfactory grade point average based on all courses attempted as well as a satisfactory science index (grade point average on all mathematics and science courses). A grade of D on any required course will not be accepted.

Students are accepted into the School of Pharmacy once a year, during fall quarter. Applications should be submitted not later than March 15. To be considered for admission to the School of Pharmacy, the applicant must forward to the Pharmacy Admissions Committee a completed application, a photograph, two interview report forms, two letters of recommendation, and complete transcripts of all work attempted, along with a list of courses in progress and courses planned before admission to the pharmacy curriculum. Applicants must appear for a personal interview with the Pharmacy Admissions Committee upon request. Applicants will be notified as to acceptance or rejection no later than July 15.

If applicants have not previously attended Auburn University, they must also be accepted by the Admissions Office before their application to the School of Pharmacy can be considered. For University applications write Admissions Office, Auburn University, Alabama, 36849-5145.

Any student in the pharmacy curriculum who is subjected to academic suspension and desires to re-enter the School of Pharmacy must, in addition to complying with the pertinent University regulations, be approved by the Pharmacy Admissions Committee for re-admission.

Guidelines to Academic Performance

I. GENERAL

- A. The implementation of all guidelines will be in addition to those existing policies and standards of the University.
- B. Grade point averages will be calculated only from professional coursework. *Professional coursework* is defined as those required and elective courses listed in the "Curricula in Pharmacy: Bachelor of Science" and any additional courses approved by the faculty.
- C. The student must observe prerequisites and corequisites stated in the current *AU Bulletin*.

II. ACADEMIC STANDARDS

- A. A student must earn passing credit in at least 12 hours of professional coursework to receive one quarter of residency credit. The student who earns passing credit in 6-11 hours of professional coursework will receive one-half quarter of residency credit.
- B. A student must maintain a minimal GPA cumulative record of 2.00 all professional coursework. A student whose cumulative GPA falls below 2.00 will be placed on academic probation.
 1. The student will remain on probation for the next three quarters of enrollment.
 2. By the end of the probationary period, the student must have earned a 2.00 cumulative GPA or the student's name will be removed from the rolls of the School of Pharmacy.
 3. During the probationary period, the student may take any professional coursework for which the prerequisites have been met.
 4. A student may not be placed on probation more than once. Instead of a second probation, the student's name will be removed from the rolls of the School of Pharmacy.
 5. A cumulative record of 2.00 in professional coursework is required for graduation in the School of Pharmacy.
- C. All F graded professional coursework must be successfully repeated as soon as the course is offered again.
- D. A course in which a student received a grade of B or A may not be repeated under any conditions.
- E. A course in which a student received a grade of C may be repeated only if all courses in which an F or D had been earned have been successfully repeated with a C or above.
- F. No required course in the professional curriculum may be repeated more than twice.

Appeals to these Guidelines may be made to the Professional and Academic Standards Committee through its chairperson.

Licensure Requirements

The Alabama State Board of Pharmacy (BOARD) regulates (ACT 205) the practice of pharmacy in the state. In brief the requirements for licensure are:

1. B.S. in Pharmacy or Pharm.D. degree from an accredited School of Pharmacy.
2. A total of 1,500 hours of practical experience under the supervision of a registered preceptor, 400 hours of which must be completed after graduation. A maximum of 400 hours of the 1,100 hours which can be earned prior to graduation may be completed while concurrently enrolled in pharmacy school.
3. Students are eligible to and should file an application with the BOARD for registration as an extern/intern at the time they enroll in the School of Pharmacy. Periods of any work experience should be reported to the Secretary of the Board within 10 days of beginning and within 10 days after ending the experience, or at intervals of 16 weeks, whichever first occurs.
4. Graduates of Schools of Pharmacy are eligible to take the BOARD examination upon completion of the extern/intern requirements. Applications for taking the BOARD examinations may be picked up at the Office of the Dean anytime after graduation.
5. The Office of the Dean of the School of Pharmacy will be glad to respond to questions on licensure. Alternatively, request for information can be referred directly to: Mr. J. W. McLane, Secretary, Alabama State Board of Pharmacy, One Perimeter Park South, Suite 425 So., Birmingham, Ala. 35243.

Continuing Education and Extension Services

Continuing education and extension service programs are available to pharmacists throughout the year. Faculty members of the School of Pharmacy, as well as practicing pharmacists and industry leaders, and consultants in state and federal governmental agencies, serve as instructors.

The Alabama Board of Pharmacy has adopted a regulation, which requires 15 clock hours of approved continuing education as a requirement for renewal of each pharmacist's controlled substances permit.

Curricula In Pharmacy

Bachelor of Science

FIRST PROFESSIONAL YEAR

First Quarter			Second Quarter			Third Quarter		
ZY	560	Mammalian Phys. I5	ZY	561	Mammalian Phys. II5	PC	347	Human Pathology5
CH	301	Biochemistry5	CH	302	Biochemistry5	BY	302	Med. Microbiol.5
PY	301	Pharmaceutics I5	PY	302	Pharmaceutics II5	PC	346	Clin. Eval. Drug Ther.3
		Elective*3	PCS	361	Drug Lit. Anal.3	PY	316	Mod. Meth. Drug Anal. 4

SECOND PROFESSIONAL YEAR

Fourth Quarter

PY	420	Med. Chem. I	5
PY	531	Pharmacology I	5
PY	401	Pharmaceutics III	5
PCS	471	Prof. Comm. I	3

Fifth Quarter

PY	421	Med. Chem. II	4
PY	532	Pharmacology II	5
PY	432	Chem. Ph'col. Lab	1
PC	447	Therapy of Disease I	3
PCS	562	Intr. Med. Info. Syst.	3
PC	452	Drug Info. Orient.	2

Sixth Quarter

PY	422	Med. Chem. III	5
PY	533	Pharmacology III	4
PY	433	Chem. Ph'col. Lab	1
PC	448	Therapy of Disease II	3
PY	403	Pharmaceutics IV	3
		Prof. Elective	3

THIRD PROFESSIONAL YEAR

PC	457	Drug Interactions	3
PC	449	Drug Therapy in Clinical Practice	5
PCS	464	Jurisprudence	5
PCS	360	Pharmacy Convoc.	0
PY	535	Toxicology	5

PCS	360	Pharmacy Convoc.	0
PCS	465	Phar. Oper. Sys.	5
		Prof. Electives**	13

PC	459	Externship	15
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*Elective Credit is restricted to courses offered by the Departments of Philosophy and Psychology.

**Doctor of Pharmacy students must elect PY 502 Pharmacokinetics.

TOTAL — 159 QUARTER HOURS (B.S.)

NOTES:

1. Proficiency in typing is required of all entering students.
2. Students must participate in field trips to a pharmaceutical manufacturing plant during their junior or senior year, and to a wholesale drug company during their senior year.
3. A set of Class C, metric and Apothecaries' weights, which may be purchased from Pharmacy Supply, is required for all Pharmacy laboratories.
4. Students will be required to spend one quarter of their third professional year in an off-campus, structured, externship experience.
5. Students enrolled in clinical or externship courses are required to furnish personal professional liability insurance.
6. All pharmacy elective courses are acceptable for option credit. Faculty advisers will provide information on any non-pharmacy elective courses which are acceptable.
7. A student who is qualified and has the prerequisites may take up to 10 hours of graduate coursework in the fifth year; however, such work cannot be applied toward both the undergraduate and graduate degrees.

Doctor of Pharmacy

Qualified students enrolled in the B.S. program at Auburn may be considered for entry into the Doctor of Pharmacy program upon completion of the Seventh Quarter of the baccalaureate curriculum in pharmacy and acceptance by the Doctor of Pharmacy Admissions Committee. Graduates of other accredited schools/colleges of pharmacy are eligible for the program and may apply to the Doctor of Pharmacy Admissions Committee. While the program is designed to interface with the baccalaureate program such that in the future the Pharm. D. may become the single entry degree, at this time the program is in addition to the baccalaureate program and of limited enrollment.

The program of study is conducted at the University of Alabama Hospitals in Birmingham and consists of one continuous calendar year (52 weeks) of course work. The program begins in June of each year and ends in June of the following year with five weekday holidays granted. Ninety quarter credit hours of work are required in this program which is equivalent to five academic quarters.

Doctor of Pharmacy Curriculum

Summer Session*

PC	461	Intr. to Clin. Environment	15
PC	462	Applied Pharmacokinetics	3
PC	463	Adv. Therapeutics	6
PC	464	Drug Info. Retrieval & Analysis	3

Fall-Winter-Spring Session*

PC	465	Clin. Seminar	1
		Clerkships	72

*The two sessions are completed in one calendar year equivalent to five academic quarters.

TOTAL — 90 QUARTER HOURS



College of Sciences and Mathematics

J. IVAN LEGG, *Dean*

WILLIAM L. ALFORD, *Associate Dean for Research*

WILLIAM H. MASON, *Associate Dean for Academic Affairs*

THE COLLEGE OF SCIENCES AND MATHEMATICS provides programs in the physical sciences, life sciences, and mathematical sciences at both the undergraduate and graduate levels. In addition, the College offers scientific and mathematical service courses for students enrolled in most of the other colleges and schools. The College includes the following academic areas: Biochemistry, Botany, Chemistry, Geology, Mathematics, Microbiology, Physics, Biological Statistics, Wildlife Science, and Zoology. The Arboretum, Nuclear Science Center, and Plant Molecular Genetics Laboratory are also included in the College of Sciences and Mathematics.

Undergraduate Degrees

Four-year bachelor's degree programs are offered in two areas:

1. *Departmental Curricula* are available in botany, chemistry, chemistry with biochemistry option, geology, laboratory and medical technology, microbiology, marine biology, mathematics, applied mathematics, physics, applied physics, wildlife science, and zoology.

2. *Pre-professional Programs* leading to bachelor's degrees are offered in pre-dentistry, pre-medicine, pre-optometry, pre-physical therapy, pre-dental hygiene, pre-occupational therapy, pre-pharmacy, and pre-veterinary medicine.

Embodied in these curricula are the requirements of the University-wide Liberal Education Program.

Graduate Degrees

Master of Science and Doctor of Philosophy degrees are offered in the College of Sciences and Mathematics. Degree programs are described in the *Graduate School Bulletin*.

Dual Degree Program in Engineering

This program provides for enrollment in a curriculum of the College of Sciences and Mathematics for approximately three academic years and in the College of Engineering for approximately two academic years.

The student must complete the basic requirements of the Liberal Education Program and the requirements for a major within a department in the College of Sciences and Mathematics. The student is not required to complete any minors or take the usual number of hours of electives. Thus, he/she may transfer to the College of Engineering after the end of the junior year. Following completion of the academic requirements for one of the 11 baccalaureate degrees in the College of Engineering, two degrees will be awarded: a Bachelor of Science degree in the Sciences and Mathematics major, and a bachelor's degree in the designated engineering field.

Curriculum in Materials Engineering

An interdisciplinary curriculum in materials engineering is administered by the Department of Mechanical Engineering in the College of Engineering. It is conducted cooperatively by academic departments of the College of Engineering and the College of Sciences and Mathematics through a faculty Materials Engineering Curriculum Committee.

Teacher Education

Students with majors in mathematics or the sciences who wish also to prepare for certification as teachers in secondary schools may pursue the dual objective of completing the requirements for the B.S. degree in their major and the requirements of the Teacher Education Program.

Students who choose the dual objective program should declare this intent to their departmental advisers by the end of their sophomore year. Students pursuing the dual objective plan will be assigned an adviser in the College of Education who will advise them on all matters involving requirements for completing the Teacher Education Program. (See detailed discussion of admission and retention procedures for teacher education elsewhere in this *Bulletin*.)

Cooperative Education Programs

Cooperative Education Programs give students an opportunity to integrate their academic training with work experience. Students alternate between school and a work assignment provided through the Director of the Cooperative Education Program.

Advisory Services for Students

Before a major is declared, the office of the Dean provides counseling services to the student. After a major is declared, the head of the department (or his designee) in which the student majors becomes the student's adviser and is charged with outlining the student's major and minor work.

The University Honors Program

This program offers individual learning opportunities, the possibility of accelerated entry into a master's program, and participation in honors courses to entering freshmen with extraordinarily high academic aptitude.

The General Sciences and Mathematics Curriculum (GSM)

This curriculum is for freshmen who have not decided on a specific major field of study and for transfer students having deficiencies which preclude their acceptance in a degree program. Freshmen in this curriculum must declare a major by the end of their third quarter. Transfer students must complete a specific approved program designed to clear their admission to a major field of study.

FRESHMAN YEAR

First Quarter			Second Quarter			Third Quarter		
MH	161	An. Geom. & Cal.*5	MH	162	An. Geom. & Cal.5	MH	163	An. Geom. & Cal.5
		Science Requisite**5			Science Requisite**5			Science Requisite**5
FL		Foreign Language5	FL		Foreign Language5	FL		Foreign Language5
EH	101	English Comp.3	EH	102	English Comp.3	EH	103	English Comp.3

*Students not prepared for MH 161 must pass MH 160.

**Science requirement must be satisfied by taking courses from the following sequences: BI 101-102-103; CH 111-112-113 or CH 103-104-105 and labs; GL 110 and 103 and 240; PS 205-206-207 or PS 220-221-222 and labs.

Departmental Curricula

Departmental curricula leading to the Bachelor of Science degree include botany, chemistry, chemistry with biochemistry option, geology, microbiology, marine biology, laboratory and medical technology, mathematics, applied mathematics, physics, applied physics, wildlife science, and zoology.

Botany

The Botany major is for those students interested in a fundamental plant science. The required courses serve as a basis for a knowledge of plants and future experimentation with plant systems. Proper elective selection prepares students for various careers in the plant sciences.

Curriculum in Botany (BY)

FRESHMAN YEAR

First Quarter			Second Quarter			Third Quarter		
BI	101	Prin. of Biology5	BI	102	Plant Biology5	BI	103	Animal Biology5
MH	160	Pre-Cal. w/Trig5	MH	161	An. Geom. & Cal.5	CH	103	Fund. Chem.5
EH	101	English Comp.3	EH	102	English Comp.3			& Lab.5
HY	101	World History3	HY	102	World History3	EH	103	English Comp.3
		ROTC or Elective1			ROTC or Elective1	HY	103	World History3
								ROTC or Elective1

SOPHOMORE YEAR

CH 104 Fund. Chem. & Lab. ....5	CH 207 Org. Chem. & Lab. ....5	MB 300 Gen. Microbiol. ....5
ZY 300 Genetics ....5	PLP 309 Gen. Plant Pathology ....5	CH 208 Org. Chem. & Lab. ....5
EC 200 Gen. Economics or ROTC or Elective ....1	GL 110 Phys. Geol. ....5	ZY 200 Gen. Microbiol. ....5
AEC 202 Ag. Economics I ....5	ROTC or Elective ....1	ROTC or Elective ....1
	Elective ....3	BST 210 Microcomputer App.3

JUNIOR YEAR

EH 141 Med. Vocab. ....3	PS 206 Intr. Physics II & Lab. ....4	PS 207 Intr. Physics III & Lab. ....4
PS 205 Intr. Physics I & Lab. ....4	AY 304 General Soils ....5	BY 306 Fund. Plant Physiology ....5
BST 215 Intr. Biol. Stat. or Electives ....6	EHA 304 Tech. Writing or Electives ....3-5	PA 306 Philosophy Elec. ....3
BST 501 Bio. Statistics ....5	EHA 315 Bus. & Prof. Writing Electives ....3-5	Electives6

SENIOR YEAR

BY 513 Gen. Plant Ecol. ....5	BY 535 Plant Dev.: Cells & Tissues or 536 Plant Dev.: Organs ....5	BY 506 Systematic Botany ....5
FL 121 French or German* ....5	FL 122 French or German* ....5	Electives ....13
FL 151 Zool. Elective ....5	FL 152 German* ....5	
ZY 200 Gen. Microbiol. ....5	Electives ....6	

Students in consultation with their academic advisers should take a minimum of 10 hours of electives in each of the three areas of Sciences and Mathematics, Humanities and Fine Arts, and Social Studies.

1EH 400 — Advanced Composition (5 hours) as a third alternative.

*Any foreign language acceptable; French or German preferred.

TOTAL — 210 QUARTER HOURS**Program in Biological Statistics (BST)**

The program in Biological Statistics is administered by the Department of Botany and Microbiology. The program is designed to provide undergraduate students with an introduction to statistics, computer applications, and computer programming. Graduate students with interest in life sciences may obtain a minor in applied biological statistics if they so desire.

Chemistry

This American Chemical Society accredited curriculum prepares students for careers in both pure and applied chemistry with a dual emphasis on classroom and laboratory experience. A flexible senior year allows students to tailor the program to their individual professional goals. Graduates will be prepared to enter the profession immediately or continue for advanced degree programs. The senior research program is designed to introduce students to modern advanced techniques and approaches to chemical research in an area of their interests by completing an individual research project in conjunction with a faculty adviser.

Curriculum in Chemistry (CH)**FRESHMAN YEAR**

First Quarter		Second Quarter		Third Quarter	
CH 111 General Chem. ....4	CH 112 General Chem. ....4	CH 113 General Chem. ....4			
CH 111L Gen. Chem. Lab. ....1	CH 112L Gen. Chem. Lab. ....1	CH 113L Gen. Chem. Lab. ....1			
MH 161 An. Geom. & Cal. ....5	MH 162 An. Geom. & Cal. ....5	MH 163 An. Geom. & Cal. ....5			
EH 101 English Comp. ....3	EH 102 English Comp. ....3	EH 103 English Comp. ....3			
HY 101 World History ....3	HY 102 World History ....3	HY 103 World History ....3			
ROTC or Elective ....1	ROTC or Elective ....1	ROTC or Elective1			

SOPHOMORE YEAR

CH 207 Organic Chemistry ....4	CH 208 Organic Chemistry ....3	CH 209 Organic Chemistry ....4
CH 207L Organic Chem. Lab. ....1	CH 208L Organic Chem. Lab. ....2	CH 209L Organic Chem. Lab. ....2
MH 264 An. Geom. & Cal. ....5	MH 265 Lin. Diff. Equations ....3	MH 266 Topics Linear Algebra ....5
PS 220 Gen. Physics I ....3	PS 221 Gen. Physics II ....3	PS 222 Gen. Physics III ....3
PS 220L Gen. Physics Lab. ....1	PS 221L Gen. Physics Lab. ....1	PS 222L Gen. Physics Lab. ....1
Approved Elective ....3	Group Requisite ....5	Approved Elective ....3

JUNIOR YEAR

CH 507 Physical Chemistry5	CH 205 An. Chem. & Lab.5	CH 509 Physical Chemistry5
FL Foreign Language**5	CH 508 Physical Chemistry5	FL Foreign Language**5
Approved Elective***5	FL Foreign Language**5	CH 513 Analyt. Chemistry5
Approved Elective2	Approved Elective3	PS 305 Modern Physics5

SENIOR YEAR

Students will work out with their departmental advisers a program of study to meet their personal professional goals. The following courses must be included in this program: CH 510 — Intermediate Inorganic Chemistry — 5; CH 511 — Inter. Inorgan. Chem. II — 5; CH 490 — Special Problems in Chemistry — 5; and 10 credit hours selected from the following courses:

CH 504 Intr. to Molec. Orbital Methods5	CH 519 Biochemistry4
CH 512 Chemical Thermodynamics5	CH 519LBiochemistry Lab.1
CH 518 Biochemistry4	CH 520 Clinical Biochemistry5
CH 518LBiochemistry Lab.1	

Additional technical and general electives will be selected to complete 205 credit hours.

*Students not prepared for MH 161 must pass MH 160.

**German, French, Japanese, or Russian through the first year sequence.

***A maximum of six hours of advanced ROTC may be substituted for electives in the junior or senior year. Students will be certified to the American Chemical Society as Certified Graduates when they have made up the electives for which advanced ROTC was substituted.

GROUP REQUISITE. EC 200, PO 209, or SY 201.

APPROVED ELECTIVES

EC 200 General Economics5	HY 201-202 History of U.S.5-5
EC 206 Socio-Economic Foundations of Contemporary America3	MU 373 Appreciation of Music3
EH 253-254-255 or 260-261-262 Lit.3-3-3	MU 374 Masterpieces of Music3
EH 270-271-272 American Lit.3-3-3	PO 209 American Government5
EH 350 Shakespeare's Greatest Plays3	PG 211 Psychology5
EH 365 Southern Literature3	SY 201 Introduction to Sociology5
GY 303 The Soviet Union-Land & People3	TH 210 Theatre as Entertainment3
	U 270-271-272 Ascent of Man3-3-3

TOTAL — 205 QUARTER HOURS

Curriculum in Biochemistry (BCH)

First Quarter

CH 111 General Chemistry*4
CH 111LGen. Chem. Lab.1
MH 161 An. Geom. & Cal.**5
EH 101 English Comp.3
HY 101 World History3
ROTC or Elective1

FRESHMAN YEAR

Second Quarter

CH 112 General Chemistry4
CH 112LGen. Chem. Lab.1
MH 162 An. Geom. & Cal.5
EH 102 English Comp.3
HY 102 World History3
ROTC or Elective1

Third Quarter

CH 113 General Chemistry4
CH 113LGen. Chem. Lab.1
MH 163 An. Geom. & Cal.5
EH 103 English Comp.3
HY 103 World History3
ROTC or Elective1

SOPHOMORE YEAR

CH 207 Organic Chemistry4	CH 208 Organic Chemistry3
CH 207LOrganic Chemistry Lab.1	CH 208LOrganic Chemistry Lab.2
PS 220 Gen. Physics I3	PS 221 Gen. Physics II3
PS 220LGen. Physics Lab.1	PS 221LGen. Physics Lab.1
MH 264 An. Geom. & Cal.5	MH 265 Lin. Diff. Equations3
ROTC or Elective1	Elective3
	ROTC or Elective1

JUNIOR YEAR

CH 507 Physical Chemistry5	CH 508 Physical Chemistry5	CH 509 Physical Chemistry5
BI 103 Animal Biology5	CH 205 An. Chemistry & Lab.5	BY 300 Gen. Microbiology5
EH 390 Adv. Comp.5	ZY 310 Cell Biology4	ZY 524 Animal Physiology5
Approved Elective3	Approved Elective3	Approved Elective3

SENIOR YEAR

CH 518 Biochemistry4	CH 519 Biochemistry4	CH 520 Clin. Biochemistry4
CH 518LBiochem. Lab.1	CH 519LBiochem. Lab.1	FL Foreign Language5
FL Foreign Language***5	FL Foreign Language5	CH 513 Analytical Chemistry5
Group Req.5	Approved Elective5	Approved Elective3
Approved Elective3	Approved Elective3	

*Chemistry can be started with CH 101, with consent of adviser.

**Students not prepared for MH 161 must pass MH 160.

***German, French, Japanese, or Russian through the first year sequence.

GROUP REQUISITE: EC 200; PO 209; or SY 201.

APPROVED ELECTIVES

EC 200 General Economics	5	HY 202 History of U.S.	5
EC 206 Socio-Economic Foundations of Contemporary America	3	MU 373 Appreciation of Music	3
EH 253-254-255 or EH 260-261-262	3-3-3	MU 374 Masterpieces of Music	3
EH 270-271-272	3-3-3	PO 209 American Government	5
EH 350 Shakespeare's Greatest Plays	3	PG 211 Psychology	5
EH 365 Southern Literature	3	SY 201 Introduction to Sociology	5
GY 303 The Soviet Union-Land and People	3	TH 210 Theatre as Entertainment	3
HY 201 History of U.S.	5	U 270-271-272 Ascent of Man	3-3-3

TOTAL — 204 QUARTER HOURS**Geology**

This curriculum prepares the student broadly in all aspects of geological processes and principles. This should enable him/her to make a more intelligent selection of employment or of a graduate program of study that will permit specialization in one or more of the many aspects of the science. Employment for the geologist ranges from federal and state service through university or college and industrial programs to private consulting.

The following four-year program satisfies the requirements for graduation with a Bachelor of Science degree in geology.

Curriculum in Geology (GL)

FRESHMAN YEAR			Third Quarter		
First Quarter			Second Quarter		
BI 101 Prin. of Biology	5	BI 102 Plant Biology	5	BI 103 Animal Biology	5
GL 110 Physical Geology	5	MH 161 An. Geom. & Cal.*	5	GL 103 Historical Geology	5
EH 101 English Comp.	3	EH 102 English Comp.	3	EH 103 English Comp.	3
HY 101 World History	3	HY 102 World History	3	HY 103 World History	3
SOPHOMORE YEAR					
CH 103 Fund. Chem. & Lab.	5	CH 104 Fund. Chem. & Lab.	5	CH 105 Fund. Chem. & Lab.	5
GL 205 Paleobotany	5	GL 206 Invert. Paleozoology	5	GL 240 Struct. & Geotect.	5
MH 162 An. Geom. & Cal.	5	MH 163 An. Geom. & Cal.	5	PO 209 American Govt.	5
EH Literature***	3	EH Literature***	3	EH Literature***	3
JUNIOR YEAR					
GL 301 Mineralogy	5	GL 302 Optical Mineralogy	5	GL 305 Ign. & Met. Pet.	5
PS 205 Intr. Physics I & Lab.	4	PS 206 Intr. Physics II & Lab.	4	PS 207 Intr. Physics III & Lab.	4
Minor I	5	Minor I	5	Minor I	5
SENIOR YEAR					
GL 401 Sed. Pet.	5	GL 411 Stratigraphy	5	GL 421 Economic Geology	5
Group Requisite	5	Minor II	5	Minor II	5
Minor II	5	Elective	5	Elective	5

*Students not prepared for MH 161 must pass MH 160.

**During the Summer Quarter following the second year, the student should take GL 215 (6), PO 210 (5) and IE 102 (2).

***EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

GROUP REQUISITE. A course in music, theatre, art, speech communication, journalism, economics, psychology, or religion.

MINORS. Two 15-hour minors (or one 30-hour double minor) should be selected with the advice and approval of the student's departmental adviser. Students planning a minor in chemistry, civil engineering, or physics should also plan a second minor in mathematics.

TOTAL — 202 QUARTER HOURS**Laboratory Technology and Medical Technology**

This curriculum, leading to the degree of Bachelor of Science in Laboratory Technology or Bachelor of Science in Medical Technology, is designed to prepare students for medical laboratory careers in fields such as public health, bacteriology, environmental testing, industrial quality control, research, and forensic science. Graduates of this curriculum may choose to qualify as certified medical technologists. This can be accomplished by successfully completing a 12-month training period (rotating hospital internship) in an accredited School of Medical Technology and passing a national certifying examination.

The requirement for the degree of Bachelor of Science in Laboratory Technology is the successful completion of the 12 quarters of the laboratory technology curriculum. Upon graduation a student may enter the work force in a laboratory field or may choose to begin a 12-month training period in a School of Medical Technology. Upon completion of the training and successful completion of a national certifying examination, the graduate will be certified as a medical technologist.

The Medical Technology option leads to the Bachelor of Science degree in Medical Technology (conferred by Auburn University). Degree requirements include successful completion of the first nine quarters of the laboratory technology curriculum and of the 12-month period in a School of Medical Technology approved by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) and by the Head of the Department of Chemistry at Auburn University. This school must be affiliated with Auburn University. Graduates of this curriculum should plan to become certified medical technologists by passing one of the national certifying examinations administered by an approved certifying body.

Further requirements for the Medical Technology Option include: (1) Auburn University Students transferring into medical technology must complete one academic year (54 hours) in the laboratory technology curriculum preceding the year of internship, and (2) transfers from other institutions must complete the junior year of the laboratory technology curriculum at Auburn prior to internship.

Curriculum in Lab. Tech. (LT) & Med. Tech. (MDT)

FRESHMAN YEAR

First Quarter			Second Quarter			Third Quarter		
CH	103	Fund. Chem. & Lab. ....5	CH	104	Fund. Chem. & Lab. ....5	CH	105	Fund. Chem. & Lab. ....5
MH	160	Pre-Cal. w/Trig. ....5	HY	102	World History ....3	MH	161	An. Geom. & Cal. ....5
EH	101	English Comp. ....3	EH	102	English Comp. ....3	EH	103	English Comp. ....3
HY	101	World History ....3	BI	101	Prin. Biology ....5	HY	103	World History ....3
LT	101	Orientation ....1			Elective ....2			

SOPHOMORE YEAR

CH	207	Organic Chem. & Lab. ....5	CH	208	Organic Chem. & Lab. ....5	CH	204	Analyt. Chem. & Lab. ....5
PS	205	Intr. Physics I & Lab. ....4	PS	206	Intr. Physics II & Lab. ....4	MB	300	Gen. Microbiology ....3
ZY	250	Human Anatomy ....5	ZY	251	Physiology ....5			Group Requisite I ....5
		Comptr. Prog.* ....3			Elective ....2-3			Elective ....3-5

JUNIOR YEAR

CH	301	Biochemistry ....5	CH	302	Biochemistry ....5	CH	520	Clin. Biochemistry ....5
MB	446	Clin. Microb. ....5	LT	401	Adv. Hematology ....5	LT	405	Immunology II ....5
LT	301	Hematology ....5	MB	543	Immunology ....5	ZY	511	Parasitology ....5
		Human. Elect.† ....3-5			Group Requisite II ....4-5			

SENIOR YEAR

LT	525	Clin. Instr. ....5	EHA	304	Technical Writing ....3			Group Requisite II ....3-5
		Group Requisite II ....5			Group Requisite II ....5			Elective ....10
		Elective ....8	SC	140	App. Sp. Comm. ....3			
					Elective ....5			

MEDICAL TECHNOLOGY OPTION — (PROFESSIONAL YEAR) — A 12-month training program undertaken at an accredited School of Medical Technology.

SENIOR YEAR

MDT	406	Cl. Hematology ....12	MDT	402	Cl. Microbiol. ....10	MDT	425	Chemistry ....16
MDT	408	Immunohematology ....4	MDT	405	Cl. Parasitology ....3	MDT	401	Urinalysis ....3
			MDT	407	Cl. Serology ....3			

*Computer Programming courses may be selected from MN 207, CSE 204, BST 210, or BST 216.

†Humanities elective may be selected from HY 306, HY 206, U 270, 271, 272, PA 218.

GROUP REQUISITE I: EC 200, PO 209, SY 201, or PA 211.

GROUP REQUISITE II: ZY 300, 308, 310, 509, 520, 524; BST 215 or PG 315; PS 207; MB 504, 522, 540, 542; BY 505; PY 316, 535.

Approved Electives: EC 200, 206; EH 253, 254, 255, 260, 261, 262, 270, 271, 272, 350, 365; FL (French or German through the first two quarters of the first year sequence as a minimum); GY 303; HY 201, 202; MU 373, 374; PA 111, 211; PO 209; PG 211; SY 201; and TH 210.

Students must select one or more courses from each of the above categories

TOTAL — 205 QUARTER HOURS

Mathematics

This curriculum is designed to prepare students for graduate study and eventual careers as mathematicians. In order to graduate with a major in mathematics, a student must have an overall **C** average or better in all mathematics courses attempted above the 100-level, for which a grade other than **W** has been assigned.

Curriculum in Mathematics (MH)

FRESHMAN YEAR			SOPHOMORE YEAR		
First Quarter			Second Quarter		
FL	Foreign Language*	.....5	FL	Foreign Language*	.....5
MH	161 An. Geom. & Cal.**	.....5	MH	162 An. Geom. & Cal.	.....5
EH	101 English Comp.	.....3	EH	102 English Comp.	.....3
HY	101 World History	.....3	HY	102 World History	.....3
	ROTC or Elective	.....1		ROTC or Elective	.....1
JUNIOR YEAR			SENIOR YEAR		
MH	264 An. Geom. & Cal.	.....5	MH	269 Elem. Diff. Equations	.....5
	Natural Science†	.....4-5	MH	331 Intr. Mod. Alg. I	.....5
EH	Literature††	.....3		Natural Science	.....4-5
	ROTC or Elective	.....1	EH	Literature††	.....3
				ROTC or Elective	.....1
FL	Foreign Language*	.....5	FL	Foreign Language*	.....5
MHC	520/		MHC	531 Intr. Mod. Alg. III	.....5
MHT	520 Analysis I	.....5	MHC	521/	
	Elective†††	.....3	MHT	521 Analysis II	.....5
	Elective	.....3		Elective	.....3
MH	Requisite***	.....3-5	MH	Requisite***	.....5
	Elective	.....5		Group Requisite	.....5
	Elective	.....3		Elective	.....5
				Elective	.....3

*Completion of two languages, French, German, Russian, through the first year sequence or one of these languages through the second year sequence.

**Students not prepared for MH 161 must pass MH 160.

***MH Requisite: MH, MHC, or MHT courses numbered 300 or above subject to approval of adviser.

†The natural science requirement may be met by taking PS 220-221-222 or CH 111-112-113. If the 12-hour physics sequence is selected, an additional 3-hour elective will be needed to meet the 196-hour requirement.

††EH 253-254-255 or 260-261-262 or 270-271-272.

†††Appropriate electives to meet the interests of the student may be selected in consultation with the departmental adviser.

GROUP REQUISITES. These requisites are chosen from the social sciences.

TOTAL — 196 QUARTER HOURS

Applied Mathematics

This is a mathematics curriculum suitable for those preparing for graduate work in mathematics as well as for those anticipating careers supported by significant applied mathematics.

An important feature is the option for the student to concentrate, by means of technical electives, on an area to which mathematics can be applied: one of the traditionally allied fields, such as engineering, physical science, or computer science; or the more recently allied areas such as the biological, behavioral, or managerial sciences. By selecting the discrete mathematics option starting in the junior year, a student can develop the background in mathematics needed to support graduate work in computer science. Students using this curriculum in preparing for graduate study in mathematics should be aware of the foreign language requirements for advanced degrees. In order to graduate with a major in mathematics, a student must have an overall **C** average or better in all mathematics courses attempted above the 100-level, for which a grade other than **W** has been assigned.

Students who desire more flexibility or more emphasis on the liberal arts should pursue the MH curriculum.

Curriculum in Applied Mathematics (AMH)

First Quarter			FRESHMAN YEAR			Third Quarter		
MH	161	An. Geom. Cal. ....5	MH	162	An. Geom. Cal. ....5	MH	163	An. Geom. Cal. ....5
EH	101	English Comp. ....3	EH	102	English Comp. ....3	EH	103	English Comp. ....3
HY	101	World History** ....3	HY	102	World History** ....3	HY	103	World History** ....3
		Science*** ....5			Science*** ....5	PS	220	General Physics I ....3
		ROTC or Elective ....1			ROTC or Elective ....1	PS	220L	Gen. Physics Lab. I ....1
								ROTC or Elective ....1
			SOPHOMORE YEAR					
MH	264	An. Geom. Cal. ....5	MH	269	Elem. Diff. Eqns. ....5	MH	337	Intr. Linear Alg. ....5
MH	271	Intr. Math Program ....3	MH	331	Intr. Modern Alg. I ....5	MH	332	Intr. Modern Alg. II ....5
PS	221	General Physics II ....3	PS	222	General Physics III ....3			Group Requisite I ....3
PS	221L	Gen. Physics Lab II ....1	PS	222L	Gen. Physics Lab III ....1			Group Requisite II ....3
		Group Requisite II ....5			Group Requisite II ....3			
			JUNIOR YEAR					
MHC	520/		MHC	521/		MHC	522/	
MHT	520	Analysis I ....5	MHT	521	Analysis II ....5	MHT	522	Analysis III ....5
MHC	567	Probability Thy. ....5	MHC	568	Math. Statistics I ....5			Appl. Math. Requisite ....5
		Group Requisite I ....3			Group Requisite I ....3			Group Requisite I ....5
		Group Requisite II ....3			Group Requisite II ....3			Group Requisite II ....3
			SENIOR YEAR					
MHT	563	Intr. Numer. An. ....5	MHC	533/				Appl. Math. Requisite ....5
		Appl. Math. Requisite ....5	MHT	564	Numer. Matrix An. I ....5			Group Requisite I ....5
		Group Requisite I ....3			Appl. Math. Requisite ....5			Elective ....7
		Elective ....4			Group Requisite I ....3			
					Elective ....4			
			DISCRETE MATHEMATICS OPTION					
			JUNIOR YEAR					
MHC	577	Comb. Designs ....5			Appl. Math. Requisite ....5			Appl. Math. Requisite ....5
MHC	520/		MHC	521/				Math. Elective ....5
MHT	520	Analysis I ....5	MHT	521	Analysis II ....5			Group Requisite I ....5
		Group Requisite I ....3			Group Requisite I ....3			Group Requisite II ....3
		Group Requisite II ....3			Group Requisite II ....3			
			SENIOR YEAR					
MHC	537	Linear Algebra ....5	MHT	563	Intr. Numer. An. or			Appl. Math. Requisite ....5
		Appl. Math. Requisite ....5	MHC	533/				Group Requisite I ....5
		Group Requisite I ....3	MHT	564	Numer. Matrix An. I ....5			Elective ....7
		Elective ....4			Appl. Math. Requisite ....5			
					Group Requisite I ....3			
					Elective ....4			

*Students not prepared for MH 161 must pass MH 160.

**Students may substitute HY 121-122-123 for HY 101-102-103.

***CH 103-103L-104-104L or BI 101-102 or BI 101-103.

APPLIED MATHEMATICS REQUISITES

Students not in the discrete option will select, in consultation with a departmental adviser, 20 hours of upper division mathematics (MH, MHC, MHT). Students electing the discrete mathematics option will select 25 hours from MH 339; MHC 512, 515, 516, 518, 571, 573, 575.

GROUP REQUISITE I. A minimum of 25 hours of requisite credit must be taken in areas especially concerned with the application of mathematics. At least 15 hours must be taken in the same area. Primary areas for concentration are:

Botany-Zoology	Physics	Civil Engineering
Chemistry	Psychology	Computer Science and Engineering
Economics	Aerospace Engineering	Electrical Engineering
Geology	Chemical Engineering	Industrial Engineering
		Mechanical Engineering

Computer Science Concentration

Students who wish a concentration in computer science are advised to select courses from the following: EE 330, 335, 430, 521; CSE 200, 220, 230, 301, 340, 350, 360, 500, 501, 505, 511, 512, 520, 521, 522, 523, 530, 531, 540.

GROUP REQUISITE II. A minimum of 20 hours of requisite credit must be taken in the social sciences area and in the humanities and fine arts area with at least one course in each of the two areas. Students planning graduate study beyond the Master's level should include a foreign language in Group Requisite II; in such case they must also take a social science course of at least five hours credit.

TOTAL — 201 QUARTER HOURS

Microbiology

The Microbiology major is for students who wish to pursue careers in one of the various sub-disciplines of the science or for those preparing for professional degree programs in medicine or veterinary medicine. Required courses provide a strong and broad-based background. In addition, students have the opportunity through selection of elective courses to concentrate on special areas of interest, including biotechnology, microbial physiology and genetics, and environmental, industrial, and health-related aspects of microbiology.

Curriculum in Microbiology (MB)

FRESHMAN YEAR		
First Quarter		Third Quarter
BI 101 Prin. of Biol. ....5	MH 161 An. Geom. & Cal. ....5	CH 104 Fund. Chem. & Lab. ....5
MH 160 Pre-Cal. w/Trig. ....5	EH 102 English Comp. ....3	EH 103 English Comp. ....3
EH 101 English Comp. ....3	HY 102 World History ....3	HY 103 World History ....3
HY 101 World History ....3	CH 103 Fund. Chem. & Lab. ....5	BI 102 Plant Biology ....5
ROTC or Elective ....1	ROTC or Elective ....1	ROTC or Elective ....1
SOPHOMORE YEAR		
BI 103 Animal Biology ....5	CH 208 Org. Chem. & Lab. ....5	PS 207 Intr. Physics III & Lab. ....4
PS 205 Intr. Physics I & Lab. ....4	FL 121 French or	MB 300 Gen. Microbiol. ....5
CH 207 Org. Chem. & Lab. ....5	FL 151 German* ....5	FL 122 French or
PA Elective ....3	PS 206 Intr. Physics II & Lab. ....4	FL 152 German* ....5
Elective ....1	Elective ....3	Elective ....3
JUNIOR YEAR		
ZY 300 Genetics ....5	CH 302 Biochemistry** ....5	AEC 200 Ag. Econ. or
CH 301 Biochemistry** ....5	MB 543 Immunology ....5	EC 200 Gen. Economics ....5
MB 446 Clin. and Path. Microbiol. ....5	MB 503 Bacterial Taxonomy ....5	MB 400 Microb. Methods ....5
Electives ....3	Elective ....3	Electives ....7
SENIOR YEAR		
MB 540 Microbial Phys. and Genetics ....3	Electives ....18	Electives ....18
Electives ....15		

*Any foreign language acceptable; French or German preferred.

**Or CH 518-519 with labs.

Electives may be selected from the following groups with at least 11 hours from A, an additional 30 from A or B, and the remaining from groups A, B, or free electives.

Group A	
BST 215 Intr. Biol. Stats. ....5	CH 205 Analytical Chemistry ....5
BY 505 Intr. Mycology ....5	CH 209 Organic Chemistry ....4
BY 554 Physiology of Fungi ....5	ENT 404 Insects Alf. Man and Animals ....5
CH 520 Clinical Biochemistry ....5	FAA 516 Water Quality Mgt. in Aquaculture ....5
EH 141 Medical Vocabulary ....3	HF 543 Food Chemistry ....5
EHA 304 Tech. Writ. or EH 390 Adv. Comp. ....3-5	HF 545 Food Anal. & Qual. Ctr. ....5
MB 504 Industrial Microbiology ....3	LT 301 Hematology ....5
MB 521 Industrial Microbiology Lab. ....3	MB 508 Marine Microbiology ....7
MB 522 Gene Expr. & Recomb. DNA. ....5	MH 162 -163 An. Geom. & Cal. ....5-5
MB 541 Environmental Microbiology ....5	PLP 309 Gen. Plant Pathology ....5
MB 542 Virology ....5	PY 537 Fund. of Nucleonics ....5
MB 545 Microbial Phys. Lab. ....3	SC 111 Public Speaking ....5
MB 556 Food Microbiology ....5	U 270 271, 272 Ascent of Man ....3-3
ZY 310 & 310L Cell Biology ....5-6	ZY 303 Prin. of Evolution & Systematics ....5
Group B	
BST 210 Microcomp. Appl. in Ag. ....3	ZY 306 Prin. of Ecology ....5
BY 514 Biological Microscopy ....5	ZY 511 Parasitology ....5
CH 105 & 105L Fund. of Chem. III ....5	ZY 517 Prin. of Population Genetics ....5
CH 204 & 204L Analytical Chemistry ....5	ZY 524 Animal Physiology ....5

During the sophomore year students will develop a plan of study for the junior and senior years from lists of approved elective courses with the assistance and approval of their adviser and dean. Substitutions may be permitted to meet specific needs of individual students.

TOTAL — 210 QUARTER HOURS

Physics

This curriculum provides a thorough understanding of the field of physics and develops the ability to apply theoretical and experimental techniques to a wide range of problems.

It provides a firm foundation for careers in physics and related fields and an excellent preparation for further study.

Graduates find opportunities in industrial and government research and development; chemical, geological, biological and mathematical physics; medical and dental research; environmental science; and teaching and/or research at the college or university level.

Curriculum in Physics (PS)

FRESHMAN YEAR		
First Quarter		
CH 111 Gen. Chem. & Lab. ....5	CH 112 Gen. Chem. & Lab. ....5	CH 113 Gen. Chem. & Lab. ....5
MH 161 An. Geom. & Cal.* ....5	MH 162 An. Geom. & Cal. ....5	MH 163 An. Geom. & Cal. ....5
EH 101 English Comp. ....3	EH 102 English Comp. ....3	PS 220 Gen. Physics I & Lab. ....4
HY 204 Technology & Civil** ....3	HY 205 Technology & Civil** ....3	HY 206 Technology & Civil** ....3
ROTC or Elective ....1	ROTC or Elective ....1	ROTC or Elective ....1
Elective ....1	Elective ....1	Elective ....1
Second Quarter		
Third Quarter		
MH 264 An. Geom. & Cal. ....5	MH 269 Elem. Diff. Equations ....5	PS 302 Electronics ....5
PS 221 Gen. Phys. II & Lab. ....4	PS 222 Gen. Phys. III & Lab. ....4	PS 305 Innr. Modern Physics ....4
EH 103 English Comp. ....3	IE 250 Compr. Prog. ....3	MH 362 Engineering Math I ....3
Elective ....5	Group Requisite ....5	Elective ....3
ROTC or Elective ....1	ROTC or Elective ....1	ROTC or Elective ....1
SOPHOMORE YEAR		
JUNIOR YEAR		
PS 300 Electricity & Magnet ....4	PS 501 Mechanics I ....5	PS 502 Mechanics II ....5
MH 501 Vector Calculus ....3	PS 301 Electricity and Magnet ....4	PS 303 Optics ....4
Group Requisite ....5	PS 306 Physics Laboratory ....2	MH 506 Partial Diff. Equat. ....3
Elective ....5	Group Requisite ....5	Group Requisite ....5
SENIOR YEAR		
PS 515 Modern Physics I ....5	PS 516 Modern Physics II ....5	PS 507 Exp. Physics II ....2
PS 506 Exp. Physics I ....2	PS 504 Stat. Thermodynamics ....5	PS 520 Nuclear & Elem. Part. ....5
Physics Elective ....3	Physics Elective ....3	Elective ....5
Electives ....7	Elective ....3	Elective ....5

*Students not prepared for MH 161 must pass MH 160.

**Students may substitute HY 101-102-103 for HY 204-205-206.

GROUP REQUISITES. A minimum total of 20 hours of requisite credit must be taken in the social sciences area and in the humanities and fine arts area with at least one course in each of the two areas. Students planning graduate study in science are encouraged to complete one year of study in French, German, or Russian as part of the Group Requisite.

TOTAL — 207 QUARTER HOURS

Applied Physics

This curriculum provides a foundation in physics and emphasizes several related technical fields to provide a broader base for persons who desire to enter industrial and governmental laboratories. Individuals wishing to pursue graduate work will find that this curriculum also provides adequate preparation for advanced study.

During the junior and senior years, 20 hours of specialized courses are designated as Group Requisite I. These are to be chosen from one of the following areas: chemistry, geology, aerospace, chemical, electrical, or mechanical engineering, mathematics, or computer, environmental or nuclear science.

Students anticipating graduate work should complete French, German, or Russian through the first year sequence as a part of Group Requisite II. (See below.)

Curriculum in Applied Physics (APS)

FRESHMAN YEAR		
First Quarter		
CH 111 Gen. Chem. & Lab. ....5	CH 112 Gen. Chem. & Lab. ....5	CH 113 Gen. Chem. & Lab. ....5
MH 161 An. Geom. & Cal.* ....5	MH 162 An. Geom. & Cal. ....5	MH 163 An. Geom. & Cal. ....5
EH 101 English Composition ....3	EH 102 English Composition ....3	PS 220 Gen. Physics I & Lab. ....4
HY 204 Technology & Civil** ....3	HY 205 Technology & Civil** ....3	HY 206 Technology & Civil** ....3
ROTC or Elective ....1	ROTC or Elective ....1	ROTC or Elective ....1
Elective ....1	Elective ....1	Elective ....1
Second Quarter		
Third Quarter		
CH 111 Gen. Chem. & Lab. ....5	CH 112 Gen. Chem. & Lab. ....5	CH 113 Gen. Chem. & Lab. ....5
MH 161 An. Geom. & Cal.* ....5	MH 162 An. Geom. & Cal. ....5	MH 163 An. Geom. & Cal. ....5
EH 101 English Composition ....3	EH 102 English Composition ....3	PS 220 Gen. Physics I & Lab. ....4
HY 204 Technology & Civil** ....3	HY 205 Technology & Civil** ....3	HY 206 Technology & Civil** ....3
ROTC or Elective ....1	ROTC or Elective ....1	ROTC or Elective ....1
Elective ....1	Elective ....1	Elective1

SOPHOMORE YEAR

MH 264 An. Geom. & Cal. ....5	PS 222 Gen. Phys. III & Lab. ....4	PS 302 Electronics.....5
PS 221 Gen. Physics II & Lab. ....4	MH 265 Lin. Diff. Equations ....3	PS 305 Intr. Modern Physics....4
ME 205 Appl. Mech. Stat.***....4	IE 250 Computer Prog.....3	MH 266 Topics Lin. Algebra ....3
EH 103 English Composition....3	IE 102 Graphical Comm. Des. ....2	Group Requisite I .....5
ROTC or Elective.....2	Group Requisite I .....5	ROTC or Elective.....1
	ROTC or Elective.....1	

JUNIOR YEAR

PS 521 Modern Electronics....5	PS 501 Mechanics I .....5	PS 502 Mechanics II.....5
PS 300 Elec. & Magnetism I ....4	PS 301 Elec. & Magnetism II....4	PS 303 Optics.....4
MH 501 Cal. Vector Functions....3	PS 306 Physics Lab.....2	MH 506 Partial Diff. Equations...3
Group Requisite II.....5	Group Requisite II.....5	Group Requisite I5

SENIOR YEAR

PS 515 Modern Physics I.....5	PS 516 Modern Physics II .....5	PS 507 Exp. Physics II .....2
PS 506 Exp. Physics I.....2	PS 504 Stat. Thermodynamics 5	PS 520 Nuclear & Elem. Part....5
Group Requisite II.....5	Group Requisite I .....5	Group Requisite II.....5
Elective.....3		Elective.....6

*Students not prepared for MH 161 must pass MH 160.

**Students may substitute HY 101-102-103 for HY 204-205-206.

***Students selecting a field other than engineering for their specialization area (via Group Requisite I) may take an additional course in that area as a substitution for ME 205.

GROUP REQUISITE I. Courses to be used to satisfy this requirement are to be selected by the student after consultation with and a recommendation by the department(s) in which the courses are to be taken and upon approval of the adviser.

GROUP REQUISITE II. A minimum total of 20 hours of requisite credit must be taken in the social sciences area and in the humanities and fine arts area with at least one course in each of the two areas. Students planning graduate study should include a foreign language in Group Requisite II as mentioned above; in such case they must also take a social science course for at least five hours credit.

TOTAL — 207 QUARTER HOURS**Zoological Sciences**

These curricula are designed to prepare students for graduate study and a wide variety of careers in animal biology. The student has the choice of five degree programs including two pre-veterinary medicine options: Zoology, Zoology/Pre-vet, Wildlife Science, Wildlife Science/Pre-vet, and Marine Biology.

Curriculum in Zoology (ZY)**FRESHMAN YEAR**

First Quarter		Second Quarter		Third Quarter	
BI 101 Prin. of Biology	5	BI 102 Plant Biology	5	BI 103 Animal Biology	5
CH 103 Fund. Chem. I	4	CH 104 Fund. Chem. II	4	EH 103 English Comp.	3
CH 103L Gen. Chem. Lab.	1	CH 104L Gen. Chem. Lab.	1	CH 207 Organic Chemistry	4
MH 161 An. Geom. & Cal.*	5	MH 162 An. Geom. & Cal.	5	CH 207L Org. Chem. Lab.	1
EH 101 English Comp.	3	EH 102 English Comp.	3	FL Foreign Language**	5

SOPHOMORE YEAR

CH 208 Organic Chemistry ....3	FL Foreign Language .....5	GL 110 Physical Geology .....5
CH 208L Org. Chem. Lab. ....2	PS 205 Intr. Physics I .....3	PS 206 Intr. Physics II.....3
ZY 300 Genetics.....5	PS 205L Intr. Phys. Lab. I.....1	PS 206L Intr. Phys. Lab. II.....1
FL Foreign Language .....5	ZY 303 Evolution & Syst.....5	HY 103 World History.....3
HY 101 World History.....3	HY 102 World History.....3	ZY 306 Animal Ecol.5

JUNIOR YEAR

ZY 310 Cell Biology .....4	ZY 401 Invert. Zoology .....5	MB 300 Gen. Microbiol. or
ZY 310L Cell Biol. Lab. ....2	Computer Science.....3	ZY 302 Vert. Embryo.....5
PS 207 Intr. Physics III.....3	ZY 301 Comp. Anat. or	EH 400 Adv. Composition.....5
PS 207L Intr. Physics Lab. III....1	ENT 304 Gen. Entomology.....5	GL 103 Historical Geology.....5
ZY 402 Nat. Hist. Vert. ....5	Elective****.....5	Elective****.....3
Soc. Sci. Elec.*** .....4		

SENIOR YEAR		
ZY	Elective*****.....5	ZY 524 Animal Physiol. ....5
BY	Elective*****.....5	ZY Elective*****.....5
	Soc. Sci. Elective***.....5	Electives*****.....6
	Elective*****.....3	
		ZY Elective*****.....5
		Soc. Sci. Elective***.....5
		Elective*****.....5

*Students not prepared for MH 161 must pass MH 160.

**Any foreign language is acceptable. Select in consultation with adviser.

***Consult with adviser for list of acceptable social science courses.

****It is recommended that you discuss your use of free electives with your adviser.

*****Consult with your adviser for lists of acceptable BY and ZY electives.

TOTAL — 210 QUARTER HOURS

Curriculum in Wildlife Science (WL)

FRESHMAN YEAR		
First Quarter		
BI	101 Prin. Biology.....5	BI 102 Plant Biology.....5
CH	103 Fund. Chem. I.....4	CH 104 Fund. Chem. II.....4
CH	103L Gen. Chem. Lab.....1	CH 104L Gen. Chem. Lab.....1
MH	160 Pre-Cal. w/Trig.....5	MH 161 An. Geom. & Cal.....5
HY	101 World History.....3	HY 102 World History.....3
Second Quarter		
CH	203 Organic Chemistry.....5	ZY 300 Genetics.....5
ZY	205 Wildlife Cons.....3	ZY 303 Evolution & Syst.....5
EH	101 English Comp.....3	EH 102 English Comp.....3
AEC	202 Ag. Econ. I.....5	Elective.....5
Third Quarter		
BI	103 Animal Biology.....5	BI 103 Animal Biology.....5
AEC	210 Microcomp. Appl.....3	AEC 210 Microcomp. Appl.....3
PS	200 Found. Phys.....5	PS 200 Found. Phys.....5
HY	103 World History.....3	HY 103 World History.....3
SOPHOMORE YEAR		
CH	203 Organic Chemistry.....5	ZY 300 Genetics.....5
ZY	205 Wildlife Cons.....3	ZY 303 Evolution & Syst.....5
EH	101 English Comp.....3	EH 102 English Comp.....3
AEC	202 Ag. Econ. I.....5	Elective.....5
JUNIOR YEAR		
ZY	328 Prin. Wildl. Mgt.....4	AY 304 Gen. Soils.....5
ZY	328L Prin. Wildl. Mgt.....1	EH 400 Adv. Comp. or.....5
BY	506 Syst. Botany.....5	SC 111 Public Speaking.....5
ZY	538 Ichthyology.....5	ZY 576 Mammology.....5
	Electives.....3	EHA 304 Technical Writing.....3
SENIOR YEAR		
EY	520 Silviculture.....5	ZY 401 Invert. Zoology.....5
ZY	527 Wildl. Phil.....3	ZY 528 Wildl. Biology.....4
	Policy, Pub. Rel.....3	ZY 528L Wildl. Biology Lab.....2
	Electives.....10	ZY 524 Animal Physiol.....5
		BST 501 Biol. Stats.....5
		ZY 531 Wildl. Hab. Anal.....3
		ZY 575 Ornithology.....5
		Elective.....5

Electives must be approved by adviser and will include at least 17 hours from the humanities and social sciences and 10 hours of group electives selected from a list available from the adviser or Dean. These electives should be selected carefully because students are required to graduate with the minimum educational requirements necessary to be eligible for certification by The Wildlife Society as an Associate Wildlife Biologist.

TOTAL — 210 QUARTER HOURS

Curriculum in Marine Biology (MRB)

FRESHMAN YEAR		
First Quarter		
BI	101 Prin. of Biology.....5	BI 102 Plant Biology.....5
CH	103 Fund. Chem. I.....4	CH 104 Fund. Chem. II.....4
CH	103L Gen. Chem. Lab.....1	CH 104L Gen. Chem. Lab.....1
MH	160 Pre-Cal. w/Trig.....5	MH 161 An. Geom. & Cal.....5
EH	101 English Comp.....3	EH 102 English Comp.....3
Second Quarter		
BI	102 Plant Biology.....5	BI 103 Animal Biology.....5
CH	104 Fund. Chem. II.....4	MH 162 An. Geom. & Cal.....5
CH	104L Gen. Chem. Lab.....1	PS 205 Intr. Physics I.....3
MH	161 An. Geom. & Cal.....5	PS 205L Intr. Phys. Lab. I.....1
EH	102 English Comp.....3	EH 103 English Comp.....3
Third Quarter		
BI	103 Animal Biology.....5	BI 103 Animal Biology.....5
MH	162 An. Geom. & Cal.....5	MH 162 An. Geom. & Cal.....5
PS	205 Intr. Physics I.....3	PS 205 Intr. Physics I.....3
PS	205L Intr. Phys. Lab. I.....1	PS 205L Intr. Phys. Lab. I.....1
EH	103 English Comp.....3	EH 103 English Comp.....3
SOPHOMORE YEAR		
PS	206 Intr. Phys. II.....3	PS 207 Intr. Phys. III.....3
PS	206L Intr. Phys. Lab. II.....1	PS 207L Intr. Phys. Lab. III.....1
ZY	300 Genetics.....5	CH 207 Organic Chem.....4
HY	101 World History.....3	CH 207L Org. Chem. Lab.....1
EC	200 Economics.....5	HY 102 World History.....3
		ZY 435 Gen. Oceanography.....3
		CH 208 Organic Chem.....3
		CH 208L Org. Chem. Lab.....2
		ZY 306 Prin. of Ecol.....5
		HY 103 World History.....3
		ZY 402 Nat. Hist. of Vert.....5

JUNIOR YEAR*

MB 300 Gen. Microbiol.....5	GL 110 Physical Geol.....5	GL 103 Historical Geol.....5
ZY 310 Cell Biology.....4	BST 215 Intr. Bio. Stat. or.....5	BY 513 Plant Ecology**.....5
ZY 310L Cell Biol. Lab.....2	CSE 204 Comp. Prog.....3-5	FL Foreign Language.....5
FL Foreign Language***.....5	ZY 303 Evol. & Syst.....5	Elective.....3
	FL Foreign Language.....5	

SENIOR YEAR*

SC 111 Public Speaking or.....5	ZY 301 Comp. Anat.....5	ZY 574, 575, or 576.....5
EH 400 Adv. Comp.....5	ZY 401 Invert. Zoology.....5	Group Electives.....10
BY 306 Fund. Plt. Phys.**.....5	ZY 524 An. Physiol.....5	Elective.....3
Electives.....8	Elective.....2-4	

*Students must spend summer of either Junior or Senior year at an approved marine biology laboratory and successfully complete a minimum 15 hours of coursework there. See adviser for details.

**Several other BY courses are available for substitution upon approval of adviser.

***Any foreign language is acceptable; Select in consultation with adviser.

Electives will be subject to approval by adviser and must include an additional 2 hours of humanities or social science electives and at least 10 hours of group electives selected from a list available from the adviser.

TOTAL — 225 QUARTER HOURS

Pre-Professional Curricula

Pre-professional programs are offered in pre-dentistry, pre-medicine, pre-optometry, pre-physical therapy, pre-dental hygiene, pre-occupational therapy, pre-pharmacy, and pre-veterinary medicine. Advisers are available in each curriculum to guide the students concerning admissions requirements to the professional schools. The department in which students major will advise them where applicable. Completion of these curricula does not assure admission to a professional school. Competition for admission to professional schools is keen; the number of qualified applicants exceeds the number of places available.

Pre-Dentistry and Pre-Medicine

This curriculum leads to a Bachelor of Science degree and is designed to prepare students for medical and dental schools. The requirements are very exacting and demand high scholastic competence and performance. As a minimum, students must strive for a B-plus four-year college record to attain good promise of being selected by a professional school.

The bachelor's degree is required by most dental and medical schools for admission; however, should outstanding students gain admission to a dental or medical school prior to graduation, they may receive a combination B.S. degree by completing successfully the first nine quarters of this curriculum, a total of 157 quarter hours, and the freshman year of professional school.

Students in pre-dentistry or pre-medicine should take the national Dental Aptitude Test or the Medical College Admission Test at least a year in advance of the date of entry to professional school, and follow with applications to the professional schools of their choice. Early in the junior year, the student should seek information from the Premedical-Pre-dental Advisory Committee concerning procedures to follow to obtain the necessary committee evaluation and recommendation to professional school. Forms and instructions are available in the office of the Dean of Sciences and Mathematics.

Most American medical schools recommend that medical and dental school applicants have (1) an academic year each of freshman biology, general chemistry, organic chemistry, and physics; (2) breadth in the educational experience; and (3) indepth experience in a single discipline. Auburn University students accomplish the above by enrolling in a core of 144 hours as outlined in the following curriculum model. Each student then elects an area of concentration from the College of Sciences and Mathematics (see list below) or a major from the General Curriculum majors in the College of Liberal Arts (see section on the College of Liberal Arts). Depending upon this choice, individuals will have up to 35 hours of electives.

Curriculum in Pre-Dentistry (PD), Pre-Medicine (PM)

FRESHMAN YEAR

First Quarter

CH	111	Gen. Chem. & Lab.*	5
MH	161	An. Geom. & Cal.**	5
EH	101	English Comp.	3
		Elective†	5
U	199	Orientation	1

Second Quarter

CH	112	Gen. Chem. & Lab.	5
MH	162	An. Geom. & Cal.	5
EH	102	English Comp.	3
BI	101	Prin. Biol. & Lab.	5

Third Quarter

CH	113	Gen. Chem. & Lab.	5
MH	163	An. Geom. & Cal.**	5
EH	103	English Comp.	3
BI	103	Animal Biology	5

SOPHOMORE YEAR

CH	207	Org. Chem. & Lab.	5
PS	205	Intr. Physics & Lab.***	4
EH		Literature*****	3
HY	101	World History	3
		Elective	3

CH	208	Org. Chem. & Lab.	5
PS	206	Intr. Physics & Lab.	4
EH		Literature	3
HY	102	World History	3
		Elective	3

ZY	300	Genetics	5
CH	209	Org. Chemistry	4
PS	207	Intr. Physics & Lab.	4
EH		Literature	3
HY	103	World History	3

JUNIOR YEAR

ZY	302	Vert. Embryology	5
PG	211	Psychology	5
SY	201	Sociology	5
		Major/Concentration	3

ZY	310	Cell Biol. & Lab.	6
PG	212	Dev. Psychology	5
PO	251	Elective	5
		Major/Concentration	3

EH	400	Adv. Composition	5
PO	209	Am. Govt.	5
PA	218	Ethics in Hlth. & Sci.	5
		Major/Concentration	3

Major/Concentration...5
Major/Concentration/Elective...5
Elective...5

SENIOR YEAR

Major/Concentration...5
Major/Concentration/Elective...5
Elective...4

Major/Concentration...5
Major/Concentration/Elective...5
Elective...5

*CH 103-104-105 may be taken by students not concentrating in chemistry. Chemistry may also be started with CH 101; see adviser for details.

**Students not prepared for MH 161 must pass MH 160.

***Students may substitute a course in statistics for MH 163.

****Students planning a physics concentration should take PS 220-221-222 instead of PS 205-206-207.

*****EH 253-254-255, EH 260-261-262, EH 270-271-272, or EH 250-251.

†Students are encouraged to enroll in a foreign language to capitalize on a strong high school experience. Some recommended elective courses include ANT 203, 206, 207; AT 101, 102; BI 102; BST 215; MB 300, 542, 543; CH 205, 316, 490, 507, 508, 513, 518, 519, 520; CSE 204; EC 200, 202; EH 141; FL through the first three quarters of the first year sequence; GL 110, 103; HY 306; GY 214, 215; LT 525; MH 264, 265; MN 207; NF 372; PG 315; RL (200-level); SC 111; SY 202, 577; ZY 301, 519, 520, 524, 560, 561; U 270, 271, 272, 399; and /or 300-400-500 level courses in anthropology, English, geography, history, philosophy, political science, psychology, religion, and sociology. Any other electives must be approved by the adviser.

Sciences and Mathematics Concentration Areas

Botany: BI 102, BY 306, and 20 additional hours from BY 505, 506, 513, 514, 535, 536, and 554.

Chemistry: Select 30 hours from CH 205, 209L, 301*, 302*, 316**, 490, 507**, 508, 509, 510, 513, 518*, 519*, 520, and MH 264***

Geology: GL 110, 103, 206, 240, 301, and five additional GL hours at the 200-level or above.

Mathematics: MH 264, 269, 337, 331, MHC/MHT 520, and one course from MH 332, MHC/MHT 521, MHC 533, MHT 563, or MHT 564.

Microbiology: MB 300 or 302, 446, 542, and an additional 15 hours from 400-500 level MB courses.

Physics: Select 30 hours from MH 264, 266, 269, 501, PS 300, 301, 302, 303, 305, 306, or 320. (PS 305 and 320 cannot both be taken for credit.)

Zoology: Select 15 hours from ZY 303, 306, 401, 402, or 511 and an additional 15 hours from ZY 301, 509, 524, 560, or 561.

*Credit cannot be earned for both the 300 and the 500 level biochemistry.

**Credit cannot be earned for both CH 316 and CH 507.

***MH 264 will count toward the 30 hours only if it is a pre-requisite for a chemistry course that is taken.

TOTAL — 209 QUARTER HOURS

Pre-Optometry

This curriculum leads to a Bachelor of Science degree and is designed to prepare students for the rigorous demands of American optometry schools. The requirements are exacting and demand high scholastic competence and performance. As a minimum, students must strive for a B-plus four-year college record to attain good promise of being selected by a professional school.

Each student must either select an area of concentration (see lists below the pre-medicine curriculum model) from the College of Sciences and Mathematics or a major from the General Curriculum majors listed in the College of Liberal Arts. Depending upon this choice, individuals will have up to 21 hours of free electives.

Students with outstanding records who are able to gain admission to an accredited school of optometry before graduation may qualify for the B.S. degree by one of the following methods: (1) completing successfully the first nine quarters of this curriculum, a total of 156 quarter hours, plus the freshman year of professional optometry school; or (2) completing successfully the first two years of this curriculum, a total of 106 quarter hours, plus three years of professional optometry school.

Pre-Optometry students should write for an official bulletin from each of the professional schools of their choice during the freshman year, and discuss with the *Pre-Optometry Adviser* any special requirements of those particular schools. The requirements of all the U.S. schools of optometry are covered in the suggested program below, either as required subjects or as electives. The student should take the Optometry College Admission Test and make official application for admission to the professional schools about a year in advance of the expected date of matriculation.

Curriculum in Pre-Optometry (OP)

FRESHMAN YEAR											
First Quarter			Second Quarter								
CH	111	Gen. Chem. & Lab.*	5	CH	112	Gen. Chem. & Lab.*	5	CH	113	Gen. Chem. & Lab.*	5
MH	160	Pre Cal. w/Trig.	5	MH	161	An. Geom. & Cal.	5			Group Requisite I	5
EH	101	English Comp.	3	EH	102	English Comp.	3	EH	103	English Comp.	3
BI	101	Prin. Biol. & Lab.	5	BI	103	Animal Biol. & Lab.	5	PG	211	Psychology	5
U	199	Orientation	1								
SOPHOMORE YEAR											
HY	101	World History	3	HY	102	World History	3	HY	103	World History	3
CH	207	Organic Chem. & Lab.	5	CH	208	Organic Chem. & Lab.	5			Group Requisite I	5
PS	205	Intr. Physics & Lab.	4	PS	206	Intr. Physics & Lab.	4	PG	315	Quant. Methods	5
PG	212	Dev. Psychology	5	ZY	310	Cell Biol. & Lab.	6	PS	207	Intr. Physics & Lab.	4
JUNIOR YEAR											
		Group Requisite II	5			Group Requisite II	5			Group Requisite II	5
		Group Requisite III	3			Group Requisite III	3			Group Requisite III	3
		Major/Concentration	5			Major/Concentration	5			Major/Concentration	5
PO	209	Amer. Govt.	5			Elective	2			Elective	3
SENIOR YEAR											
		Major/Concentration	5			Major/Concentration	5			Major/Concentration	5
		Major/Concentration/Elective	5			Major/Concentration/Elective	5			Major/Concentration/Elective	5
		Group Requisite II	5			Group Requisite II	5			Group Requisite II	5

Students must declare an area of concentration or a major by the end of their sixth quarter.

*CH 103-104-105 may be taken by students not concentrating in chemistry. Chemistry may be begun with CH 101; see adviser for details.

GROUP REQUISITE I: A minimum of 10 hours in social and behavioral sciences (PG, SY, EC, ANT, HY, PO).

GROUP REQUISITE II: (a minimum of 30 hours): ANT 203, 206, 207; AT 101, 102; BI 102; BST 215; MB 300, 542, 543; CH 205, 316, 490, 507, 508, 513, 518, 519, 520; CSE 204; EC 200, 202; EH 141; FL through the first three quarters of the first year sequence; GL 110, 103; HY 306; GY 214, 215; LT 525; MH 264, 265; MN 207; NF 372; PG 315; RL (200-level); SC 111; SY 202, 577; ZY 301, 519, 520, 524, 560, 561; U 270, 271, 272, 399; and/or 300-400-500 level courses in anthropology, English, geography, history, philosophy, political science, psychology, religion, and sociology. Any other electives must be approved by the adviser.

GROUP REQUISITE III: EH 253-254-255, EH 260-261-262, EH 270-271-272, or EH 250-251.

TOTAL — 201 QUARTER HOURS

Pre-Physical Therapy

At the present time, many schools, including the University of Alabama, require a baccalaureate degree for entry into physical therapy at the master's or certificate level. By 1990 all education for the professional physical therapist will be post bachelor of science. Students applying to schools of physical therapy at the master's level or certificate level should complete the following curriculum model leading to a bachelor's degree. Students should write for an official bulletin from each of the professional schools of their choice during their freshman year, and discuss with the pre-physical therapy adviser any special requirements of those particular schools.

Students applying to a two-year B.S. program in physical therapy should plan their schedules with the adviser to satisfy the requirements of their chosen school.

Curriculum in Pre-Physical Therapy (PT)

FRESHMAN YEAR

First Quarter

CH	103	Fund. Chem. & Lab. ....5
		Group Requisite I .....5
EH	101	English Comp. ....3
		Elective .....3
U	199	Orientation .....1

Second Quarter

CH	104	Fund. Chem. & Lab. ....5
MH	161	An. Geom. & Cal. ....5
EH	102	English Comp. ....3
BI	101	Prin. Biol. & Lab. ....5

Third Quarter

CH	105	Fund. Chem. & Lab.* ...5
PG	211	Psychology .....5
EH	103	English Comp. ....3
BI	103	Animal Biology .....5

SOPHOMORE YEAR

CH	203	Organic Chemistry .....5
PG	212	Psychology .....5
PS	205	Intr. Physics & Lab. ....4
HY	101	World History .....3

PG	315	Quant. Methods .....5
PS	206	Intr. Physics & Lab. ....4
HY	102	World History .....3
		Elective .....5

PS	207	Intr. Physics & Lab. ....4
SY	201	Sociology .....5
HY	103	World History .....3
		Elective .....5

JUNIOR YEAR

ZY	250	Human Anatomy .....5
SC	111	Public Speaking .....5
		Major/Concentration** 5
		Group Requisite II .....3

ZY	251	Physiology .....5
PO	209	Amer. Govt. ....5
		Major/Concentration** 5
		Group Requisite II .....3

PG	435	Abr. Psychology .....5
		Major/Concentration** 5
		Group Requisite II .....3
		Elective .....5

SENIOR YEAR

		Major/Concentration** 5
		Major/Concentration/Elective .....5
		Elective .....5

		Major/Concentration** 5
		Major/Concentration/Elective .....5
		Elective .....5

		Major/Concentration** 5
		Major/Concentration/Elective .....5
		Elective .....3

GROUP REQUISITE I: MH 140 or MH 160.

GROUP REQUISITE II: EH 253-254-255 or EH 260-261-262 or EH 270-271-272 or EH 250-251.

*Not required by all schools.

**Students will select either an area of concentration from the College of Sciences and Mathematics (see list in pre-medicine curriculum model) or a major from the General Curriculum majors listed in the College of Liberal Arts. In choosing electives, students should be sure to include any special requirements of any schools they plan to apply to for their master's degree. All electives must be approved by their adviser and would ordinarily be chosen from the following list: ANT 203, 206, 207; AT 101, 102; BI 102; BST 215; MB 300, 542, 543; CH 205, 316, 490, 507, 508, 513, 518, 519, 520; CSE204; EC 200, 202; EH 141, 400; FL through the first three quarters of the first year sequence; GL 110, 103; HY 306; GY 214, 215; LT 525; MH 264, 265; MN 207; NF 372; PG 315; RL (200-level); SY 202, 577; ZY 300, 301, 302, 519, 520, 524, 560, 561; U 270, 271, 272, 399; and/or 300-400-500 level courses in anthropology, English, geography, history, philosophy, political science, psychology, religion, and sociology.

TOTAL — 201 QUARTER HOURS

Pre-Dental Hygiene, Pre-Occupational Therapy

These curricula are designed to prepare students for admission to professional schools. The student should strive for a good college record to attain reasonable promise of being selected. Students should write for official bulletins from the professional schools of their choice early in their freshman year and discuss with their adviser any special requirements of those particular schools. Official application for admission to the professional schools needs to be made about a year in advance of the expected date of matriculation.

Curriculum in Pre-Dental Hygiene (DH)

FRESHMAN YEAR

First Quarter

MH	140	College Algebra .....5
CH	103	Fund. Chem. & Lab. ....5
HY	101	World History .....3
EH	101	English Comp. ....3
U	199	Orientation .....1

Second Quarter

BI	101	Prin. Biol. & Lab. ....5
CH	104	Fund. Chem. & Lab. ....5
HY	102	World History .....3
EH	102	English Comp. ....3

Third Quarter

ZY	250	Human Anatomy .....5
CH	105	Fund. Chem. & Lab. ....5
PG	211	Psychology .....5
EH	103	English Comp. ....3

SOPHOMORE YEAR

ZY	251	Human Physiology .....5
CH	203	Organic Chemistry .....5
		Group Requisite .....5
HY	103	World History .....3

SY	201	Intr. Sociology .....5
NUR	310	Pathophysiology .....5
		Group Requisite .....5
		Group Requisite .....5

MB	300	Gen. Microbiol. ....5
		Group Requisite .....3-5
SC	111	Public Speaking .....5
		Elective .....3-4

GROUP REQUISITE: A minimum of 18 hours in history, music, literature, or art. Applicants will be required to take the dental hygiene candidate aptitude test (DHCAT).

TOTAL — 104 QUARTER HOURS

Curriculum in Pre-Occupational Therapy (OT)

FRESHMAN YEAR		
First Quarter		Third Quarter
BI 101 Prin. Biology.....5	ZY 250 Human Anatomy.....5	PO 209 American Govt.....5
PG 211 Psychology.....5	Group Req. I.....5	ZY 251 Physiology.....5
EH 101 English Comp.....3	EH 102 English Comp.....3	EH 103 English Comp.....3
ROTC or Elective.....1	ROTC or Elective.....1	Elective.....3
LI 199 Orientation.....1		ROTC or Elective.....1
SOPHOMORE YEAR		
SY 201 Intr. Sociology.....5	SY 202 Social Problems.....5	SY 220 Statistics.....5
SC 111 Public Speaking.....5	Group Req. II.....5	Elective.....4-5
PG 212 Psychology.....5	PG 435 Abnormal Psycho.....5	Elective.....3-5
EH 260 Literature.....3	EH 261 Literature.....3	EH 262 Literature.....3
ROTC or Elective.....1	ROTC or Elective.....1	

GROUP REQUISITE I: A course in mathematics, biology, chemistry, or physics.

GROUP REQUISITE II: AT 112 or 121.

RECOMMENDED ELECTIVES: ANT 203; CH 103-104 and labs; HHP 282, 386, 485, 494; PA 218; PS 200; SY 204, 312; SCR 302.

Students who continue beyond the sophomore year should select courses from alternate group requisites and recommended electives listed above, subject to additional specific requirements of the chosen professional schools. Also recommended are one or more 200-level courses in philosophy and other courses in the humanities and social sciences.

TOTAL — 102 QUARTER HOURS

Pre-Pharmacy

This curriculum meets the requirements for admission to the Auburn University School of Pharmacy, which is fully accredited by the American Council on Pharmaceutical Education. Complete information about the professional curriculum in pharmacy may be found in the School of Pharmacy section.

To be considered for admission, the applicant must complete the basic 2-year requirements below and must have a 2.0 (C) grade point average based on all courses attempted as well as a 2.0 (C) science index (grade point average on the biological and physical science courses and mathematics). A grade of **D** on any required course will not be accepted. A student who does not qualify for admission to the School of Pharmacy after the completion of eight quarters in pre-pharmacy at Auburn University, but who meets University continuation in residence requirements may continue to register in pre-pharmacy only by special permission of the Dean of Sciences and Mathematics.

Curriculum in Pre-Pharmacy (PPY)

FRESHMAN YEAR		
First Quarter		Third Quarter
CH 111 Gen. Chem. & Lab.*.....5	CH 112 Gen. Chem. & Lab.....5	CH 113 Gen. Chem. & Lab.....5
MH 160 Pre-Cal. w/Trig.....5	MH 161 An. Geom. & Cal.....5	BI 101 Prin. Biol. & Lab.....5
EH 101 English Comp.....3	EH 102 English Comp.....3	EH 103 English Comp.....3
HY 101 World History.....3	HY 102 World History.....3	HY 103 World History.....3
		PCS 261 Pharm. Hist. & Orient.....3
SOPHOMORE YEAR		
CH 207 Org. Chem. & Lab.....5	CH 208 Org. Chem. & Lab.....5	SY 201 Intr. Sociology.....5
ZY 250 Human Anatomy.....5	PS 206 Intr. Physics & Lab.....4	PS 207 Intr. Physics & Lab.....4
PS 205 Intr. Physics & Lab.....4	EC 202 Economics II.....5	Electives***.....8
MN 207 Intr. Comp. Prog.....3	Humanities Elect.**.....3	

*Chemistry may be begun with CH 101 or CH 103; see adviser for details.

**Elective credit from the areas of English, foreign languages, journalism, art, music, theatre, history, philosophy, or religion.

***Elective credit is restricted to courses offered by the Departments of Philosophy and Psychology with no less than one course in each area.

TOTAL — 102 QUARTER HOURS

Pre-Veterinary Medicine

Students in the Pre-Veterinary Medicine (PV) curriculum must select a major by the end of their sixth quarter. Students in the College of Sciences and Mathematics may select chemistry (VCH), microbiology (VMB), wildlife science (VWL), or zoology (VZY) as majors.

The minimum requirements for admission to the College of Veterinary Medicine at Auburn University (112 hours) are incorporated into the curriculum models of all four of these majors. Those special requirements are:

EH 101-102-103.....9	BI 101-103.....10	ADS 200.....5	ZY 300.....5
EH 141.....3	CH 103-104-105.....15	ADS 220.....5	Humanities,
HY 101-102-103.....9	CH 207-208.....10	ADS 320.....4	Fine Arts, &
PO 209.....5	PS 205-206-207.....12	MB 300.....5	Social Sciences.....15

It is possible to gain admission to the College of Veterinary Medicine by completing only the minimum requirements listed above. However, it is preferable to select a major and earn a baccalaureate degree. If a student is admitted to the College of Veterinary Medicine prior to completion of the full four years, he/she may obtain a B.S. degree by successfully completing the first nine quarters of any one of the four Pre-Veterinary curricula (VCH, VMB, VWL, VZY) and the first year of veterinary school.

Application for admission to the College of Veterinary Medicine must be submitted to the Dean of that College between September 15 and October 15 preceding the admission date. A minimum GPA of 2.5 is required for application; **D** grades in required courses are unacceptable. All minimum requirements, including courses repeated due to time limitations, must be completed by the end of the spring quarter preceding the date of admission, and all advanced required courses in physical and biological sciences (organic chemistry, physics, microbiology, and genetics) must have been completed within six calendar years prior to the anticipated entrance date. Competition for admission to the professional schools is keen with the number of qualified applicants exceeding the number of places available. (For additional information, see College of Veterinary Medicine in this *Bulletin*.)

Curriculum in Pre-Veterinary Medicine (PV)

FRESHMAN YEAR		
First Quarter	Second Quarter	Third Quarter
CH 103 Fund. Chem. & Lab.*.....5	CH 104 Fund. Chem. & Lab.*.....5	CH 105 Fund. Chem. & Lab.*.....5
BI 101 Prin. Biology.....5	BI 103 Animal Biology.....5	ADS 200 Intr. An. & Da. Sci.....5
MH 160 Pre-Cal. w/Trig.....5	ADS 220 An. Biochem. & Nut.....5	PO 209 Amer. Govt. ....5
EH 101 English Comp. ....3	EH 102 English Comp. ....3	EH 103 English Comp. ....3
SOPHOMORE YEAR		
CH 207 Org. Chem. & Lab.....5	CH 208 Org. Chem. & Lab. ....5	MB 300 Microbiology.....5
PS 205 Intr. Physics & Lab. ....4	PS 206 Intr. Physics & Lab. ....4	PS 207 Intr. Physics & Lab. ....4
ADS 320 Feeds & Feeding.....4	ZY 300 Genetics.....5	EH 141 Medical Vocab. ....3
HY 101 World History.....3	HY 102 World History.....3	HY 103 World History.....3

*Chemistry may also be started with CH 101 or CH 111. See adviser for details.

TOTAL — 102 QUARTER HOURS

Curriculum in Microbiology Pre-Veterinary Medicine Option (VMB)

FRESHMAN YEAR		
First Quarter	Second Quarter	Third Quarter
BI 101 Prin. of Biology.....5	BI 102 Plant Biology.....5	BI 103 Animal Biology.....5
CH 103 Fund. of Chem. ....4	CH 104 Fund. of Chem. II.....4	CH 105 Fund. of Chem. III.....4
CH 103L Gen. Chem. Lab. ....1	CH 104L Gen. Chem. Lab. ....1	CH 105L Gen. Chem. Lab. ....1
MH 160 Pre-Cal. w/Trig.....5	MH 161 An. Geom. & Cal.....5	PO 209 American Govt. ....5
EH 101 English Comp. ....3	EH 102 English Comp. ....3	EH 103 English Comp. ....3
SOPHOMORE YEAR		
ZY 300 Genetics.....5	CH 208 Org. Chemistry.....3	PS 207 Intr. Physics.....3
CH 207 Org. Chemistry.....4	CH 208L Org. Chem. Lab. ....2	PS 207L Intr. Physics Lab. ....1
CH 207L Org. Chem. Lab. ....1	PS 206 Intr. Physics.....3	ADS 200 Intr. An. & Da. Sci.....5
PS 205 Intr. Physics.....3	PS 206L Intr. Physics Lab. ....1	MB 300 Gen. Microbiol. ....5
PS 205L Intr. Physics Lab. ....1	Hum. Soc. Elective*.....5	HY 103 World History.....3
HY 101 World History.....3	HY 102 World History.....3	EH 141 Medical Vocab. ....3
JUNIOR YEAR		
MB 540 Mic. Phys. & Gen. ....5	MB 543 Immunology.....5	ADS 320 Feeds & Feeding.....4
CH 301 Biochemistry.....5	MB 503 Bact. Taxonomy.....5	Electives**.....5
ADS 220 An. Biochem. & Nut.....5	CH 302 Biochemistry.....5	AEC 202 Ag. Econ. or
MB 446 Clin. & Path. Microb. ....5	Hum. Soc. Elective*.....5	EC 200 Gen. Economics.....5
		PA Elective***.....3

SENIOR YEAR

In the event the first-year Veterinary College alternative is not followed, the following must be completed successfully to receive the B.S. degree in Microbiology:

FL	Foreign Language I.....5	FL	Foreign Language I.....5	MB	400 Micro. Methods.....5
	Elective**.....5		Elective**.....5		Elective**.....5
	Elective**.....5		Elective**.....5		Elective**.....5

*Required to meet minimum AU Veterinary College requirements.

**At least 15 credit hours must be from elective list A, an additional 14 hours from A or B, and the remainder from list A and B, or by approval of the adviser. See approved microbiology elective list following the microbiology (MB) curriculum model.

***To be selected in consultation with adviser.

†Any foreign language acceptable; French or German preferred.

TOTAL — 210 QUARTER HOURS**Curriculum in Wildlife Science Pre-Veterinary Medicine Option (VWL)****First Quarter**

CH	103 Fund. Chem. I.....4
CH	103L Gen. Chem. Lab.....1
MH	160 Pre-Cal. w/Trig.....5
BI	101 Prin. of Biology.....5
ZY	205 Wildl. Cons.....3

FRESHMAN YEAR**Second Quarter**

CH	104 Fund. Chem. II.....4
CH	104L Gen. Chem. Lab.....1
MH	161 An. Geom. & Cal.....5
EH	101 English Comp.....3
BI	102 Plant Biology.....5

Third Quarter

CH	105 Fund. Chem. III.....4
CH	105L Gen. Chem. Lab.....1
BI	103 Animal Biology.....5
PO	209 Amer. Govt.....5
EH	102 English Comp.....3

SOPHOMORE YEAR

EH	103 English Comp.....3
CH	207 Organic Chem.....4
CH	207L Org. Chem. Lab.....1
ZY	328 Prin. Wildl. Mgt.....4
ZY	328L Prin. Wildl. Mgt. Lab.....1
ADS	200 Intr. An. & Dairy Sci.....5

HY	101 World History.....3
CH	208 Organic Chem.....3
CH	208L Org. Chem. Lab.....2
AEC	202 Ag. Econ. I.....5
ADS	220 An. Biochem.....5

MB	300 Gen. Microbiology.....5
PS	205 Int. Phys. I.....3
PS	205L Phys. Lab.....1
ZY	306 Prin. of Ecol.....5
ZY	300 Genetics.....5

JUNIOR YEAR

PS	206 Int. Phys. II.....3
PS	206L Phys. Lab.....1
HY	102 World History.....3
ZY	402 Nat. Hist. Vert.....5
EH	400 Adv. Composition.....5

ZY	401 Invert. Zoology.....5
ZY	303 Evol. & Syst.....5
ZY	528 Wildl. Biol.....4
ZY	528L Wildl. Biol. Lab.....2
EH	141 Medical Vocab.....3

PS	207 Intr. Phys. III.....3
PS	207L Phys. Lab.....1
ADS	320 Feeds & Feeding.....4
HY	103 World History.....3
	Hum. Soc. Elective.....6

SENIOR YEAR

In the event the first-year Veterinary College alternative is not followed, the following courses must be completed successfully to earn the B.S. degree in Wildlife Science:

BY	506 Syst. Botany.....5	ZY	524 Anim. Physiology.....5	ZY	574 Herpetology.....5
FY	520 Silviculture.....5	ZY	576 Mammalogy.....5	ZY	575 Ornithology.....5
BST	501 Biological Stat.....5	AY	304 Gen. Soils.....5	ZY	531 Wildl. Hab. Anal.....3
				BY	513 Plant Ecology.....5

Note: The B.S. degree in Wildlife Science Pre-Veterinary Medicine does not qualify the student for certification as associate wildlife biologist by the Wildlife Society. See adviser for information on certification requirements.

TOTAL — 210 QUARTER HOURS**Curriculum in Zoology Pre-Veterinary Medicine Option (VZY)****FRESHMAN YEAR****First Quarter**

BI	101 Prin. of Biology.....5
CH	103 Fund. Chem. I.....4
CH	103L Gen. Chem. Lab.....1
MH	160 Pre-Cal. w/Trig.....5
EH	101 English Comp.....3

Second Quarter

BI	102 Plant Biology.....5
CH	104 Fund. Chem. II.....4
CH	104L Gen. Chem. Lab.....1
MH	161 An. Geom. & Cal.....5
EH	102 English Comp.....3

Third Quarter

BI	103 Animal Biology.....5
CH	105 Fund. Chem. III.....4
CH	105L Gen. Chem. Lab.....1
MH	162 An. Geom. & Cal.....5
EH	103 English Comp.....3

SOPHOMORE YEAR

PS 205 Intr. Phys. I .....3	PS 206 Intr. Phys. II .....3	PS 207 Intr. Phys. III .....3
PS 205L Intr. Phys. Lab. I .....1	PS 206L Intr. Phys. Lab. II .....1	PS 207L Intr. Phys. Lab. III .....1
CH 207 Org. Chem. ....4	CH 208 Org. Chem. ....3	ADS 200 Intr. An. & Dairy Sci. ....5
CH 207L Org. Chem. Lab. ....1	CH 208L Org. Chem. Lab. ....2	HY 103 World History .....3
ZY 300 Genetics .....5	ZY 303 Evol. & Syst. ....5	ZY 306 Prin. of Ecol. ....5
HY 101 World History .....3	HY 102 World History .....3	

JUNIOR YEAR

MB 300 Gen. Microbiol. ....5	ADS 220 An. Biochem. & Nut. ....5	ADS 320 Feeds & Feeding .....4
ZY 402 Nat. Hist. Vert. ....5	ZY 401 Invert. Zoo. ....5	PO 209 Am. Govt. ....5
EH 400 Adv. Composition .....5	Humanities Elective* .....5	EH 141 Med. Vocabulary .....3
General Elective .....3	Computer Science .....3	Humanities Elective* .....5

SENIOR YEAR

In the event the first-year Veterinary College alternative is not followed, the following must be completed successfully to receive the B.S. degree in zoology:

GL 110 Physical Geology .....5	FL Foreign Language** .....5	FL Foreign Language** .....5
ZY 310 Cell Biol. ....4	ENT 304 Gen. Entom. or	ZY Elective* .....5
ZY 310L Cell Biol. Lab. ....2	ZY 301 Comp. Anat. ....5	BY Elective* .....5
ZY Elective* .....5	ZY 524 Animal Physiol. ....5	GL 103 Hist. Geology .....5
FL Foreign Language** .....5	ZY Elective* .....5	

*To be selected in consultation with adviser.

**To graduate with 210 hours, foreign language should be used as a humanities elective during the junior year. See adviser for details.

TOTAL — 210 QUARTER HOURS

Curriculum in Chemistry Pre-Veterinary Medicine (VCH)

FRESHMAN YEAR

First Quarter

BI 101 Prin. Biology .....5
CH 111 Gen. Chem. & Lab.* .....5
MH 161 An. Geom. & Cal.** .....5
EH 101 English Comp. ....3

Second Quarter

BI 103 An. Biology .....5
CH 112 Gen. Chem. & Lab. ....5
MH 162 An. Geom. & Cal. ....5
EH 102 English Comp. ....3

Third Quarter

PO 209 Am. Govt. ....5
CH 113 Gen. Chem. & Lab. ....5
MH 163 An. Geom. & Cal. ....5
EH 103 English Comp. ....3

SOPHOMORE YEAR

CH 207 Org. Chem. & Lab. ....5	CH 208 Org. Chem. & Lab. ....5	CH 209 Org. Chemistry .....4
PS 220 Gen. Phys. I & Lab.*** 4	PS 221 Gen. Phys. II & Lab. ....4	PS 222 Gen. Phys. III & Lab. ....4
ZY 300 Genetics .....5	ADS 200 Intr. An. & Da. Sci. ....5	HY 103 World History .....3
HY 101 World History .....3	HY 102 World History .....3	MH 264 An. Geom. & Cal. ....5

JUNIOR YEAR

CH 518 Biochem. & Lab. ....5	CH 507 Physical Chemistry .....5	CH 508 Physical Chemistry .....5
EH 141 Medical Vocab. ....3	CH 205 An. Chem. & Lab. ....5	ADS 320 Feeds & Feeding .....4
Hum. Soc. Elective †5	ADS 220 An. Biochem. & Nut. ....5	MB 300 Gen. Microbiology .....5
Hum. Soc. Elective †5	Hum. Soc. Elective †5	CH 400 -500 Major Elective †5

SENIOR YEAR

In the event the first-year Veterinary College alternative is not followed, the following must be completed successfully to receive the B.S. degree in Chemistry:

FL Foreign Language .....5	FL Foreign Language .....5	FL Foreign Language .....5
CSE 300 ††3	Elective .....5	Elective .....5
EH Literature †††3	EH Literature †††3	EH Literature †††3
CH 209L Org. Chem. Lab. ....2	CH 400 -500 Major Elective †5	CH 400 -500 Major Elective †5

*Chemistry may be started with CH 101. See adviser for details.

**Students not prepared for MH 161 must pass MH 160.

***PS 205-206-207 may be substituted for PS 220-221-222.

†To be selected in consultation with the adviser.

††Or CSE 204, MH 271, IE 300, EE 201, AE 203, BST 216.

†††EH 253-254-255; 260-261-262; 270-271-272; or 250-251.

TOTAL — 210 QUARTER HOURS

College of Veterinary Medicine

J. THOMAS VAUGHAN, *Dean*

H. C. MORGAN, *Associate Dean, Administration & Academic Affairs*

S. D. BECKETT, *Associate Dean, Research & Graduate Studies;*

Coordinator of Animal Health Research

F. F. HARSHBARGER, JR., *Assistant to the Dean*

THE COLLEGE OF VETERINARY MEDICINE offers a fully accredited program of training leading to the degree of Doctor of Veterinary Medicine. The curriculum requires four years in the professional college after completion of a pre-professional course curriculum which may take more than four years for the average applicant.

Admission

Although the largest percentage of students admitted are residents of Alabama, some spaces are available for non-Alabama students. Most of these are by contract through the Southern Regional Education Board (SREB), but a limited number of non-Alabama students not under a contract program with Auburn University may be accepted. Individuals in this category must have a minimum grade-point average of 3.0 on a 4.0 scale, must possess exceptional qualifications, pay non-resident university fees, and be citizens of the United States. Alabama and SREB students must have a minimum grade-point average of 2.5 on a 4.0 system on all course work attempted and on all required courses. A grade of **D** on any required course will not be accepted. In addition the Committee on Admissions and Standards of the College of Veterinary Medicine may require a personal interview, a reading comprehension test or an examination on any required course. The College of Agriculture and the College of Liberal Arts offer Pre-Veterinary curricula and are responsible for pre-veterinary counseling. Although farm experience and work with veterinarians are not absolute requirements for admission, applicants are urged to gain such training. Students without this experience frequently have difficulty with certain courses, particularly in the clinical areas.

Application for admission to either pre-veterinary curriculum should be made directly to the Admissions Office, Auburn University. Application for admission to the College of Veterinary Medicine, except for SREB students, should be made to the Chairman of Admissions, College of Veterinary Medicine, Auburn University, AL 36849. SREB students must apply through their appropriate state agency.

Minimum Requirements for Pre-Veterinary Medicine

1. COMPLETION OF THE LIBERAL EDUCATION PROGRAM as stated in the General Information section in this bulletin.

2. SPECIFIC COURSE REQUIREMENTS: Minimum pre-veterinary requirements for Alabama residents are exactly as listed for the pre-veterinary curriculum. The program in the College of Agriculture has the same courses, but they are distributed over nine quarters. Non-Alabama and SREB applicants must have acceptable equivalents which have been approved by the College of Veterinary Medicine. Individuals taking the pre-veterinary curriculum are expected to declare an academic major prior to their fifth quarter of enrollment.

3. ALL TRANSFER COURSES must be equivalent in hours and content. CLEP substitutions are acceptable as stated in this catalog but only for biology, history and humanities. English credit can only be earned as stated in the Liberal Education Program. Courses will not be waived on the basis of degrees or "practical experience." Pass-Fail or Satisfactory-Unsatisfactory grades are not acceptable in required courses. Consideration will not be extended to anyone with an overall or required course grade point average of less than 2.5 or who is not a bona fide resident at the time of application.

4. **TIME LIMITATION:** All required courses in the advanced physical and biological science categories must have been completed within six calendar years prior to the anticipated date of enrollment in the College of Veterinary Medicine.

Application Procedure

Admission of Alabama residents to the College of Veterinary Medicine must be gained through formal application made between September 15 and October 15 preceding the Fall Quarter in which admission is desired. The length of residence of Alabama applicants shall be a factor and they must be citizens of the United States. The final date for accepting applications from non-Alabama students is October 15 and SREB applicants should consult their advisers for their exact dates.

Application packets, available from the College of Veterinary Medicine or the Kentucky advisers, contain all materials necessary as well as the instructions for making application. A processing fee of \$25.00 is required of all applicants, and an additional \$15.00 is required of all who have not previously attended Auburn University.

If students are admitted to the College of Veterinary Medicine, they must submit one completed physical examination report on a form supplied by Auburn University at least three weeks prior to date of registration (not required by students formerly enrolled at Auburn University) and comply with the requirements of the rabies immunization program of the College. Also required are two supplemental official transcripts of any work completed after application is filed.

The final selection of students is made by the Committee on Admissions and Standards of the College of Veterinary Medicine, Auburn University. These selections are made from the applicants who have been certified by the committees in the respective states after giving due consideration to scholastic record and general adaptability for the profession. The right is reserved to accept or reject any applicant.

MICROSCOPES — In order to be admitted to the College of Veterinary Medicine, a student must own a compound microscope acceptable to the faculty. The student must furnish a microscope in all courses requiring the use of this instrument.

ADMISSION UNDER THE REGIONAL PLAN — Under the Regional Plan for Veterinary Training, the College of Veterinary Medicine currently serves two states: Alabama and Kentucky.

The Land-Grant institution in each state participating under the SREB plan maintains counseling and guidance service for students desiring admission to the College of Veterinary Medicine. Students attending other institutions should contact the Land-Grant School adviser in their state for information concerning admission requirements.

Scholastic Requirements

All applicants and students in the professional program are subject to the academic and disciplinary regulations of the College of Veterinary Medicine in addition to those of Auburn University.

Any student who earns less than a 2.25 grade-point average for any quarter will be placed on academic probation. A student who fails to earn a 2.25 grade-point average in each of the succeeding two quarters of enrollment may be dropped from the rolls of the College of Veterinary Medicine for scholastic deficiency. In addition, a student who does not have an overall average of 2.25 for an academic year or who does not have a veterinary college cumulative average of 2.25 at the end of any academic year may be required to withdraw from the College of Veterinary Medicine.

A student who makes a grade of F on any course may be required to withdraw from the College of Veterinary Medicine until such time as the course is offered again. Such a student may be required to repeat certain other courses in the curriculum for that quarter.

Clinical courses are unique in that the art and skills to be developed in them can only be acquired by full participation in the laboratories. The attendance in these courses is required except in case of illness or other extenuating circumstances as may be judged by the involved instructor. The grading in these clinical laboratory courses is primarily by subjective evaluation. When a course involves student rotation through several disciplines or sections, the student must receive a passing grade in each area before a passing grade can be given for the course.

The responsibility for counseling is shared by the Faculty of this College and the Career Development Service.

Required Withdrawal

The faculty of the College of Veterinary Medicine reserves the right to require the withdrawal at any time of any student who in the judgment of the admissions and standards committee is not profiting from the instruction offered, who is neglectful, irregular, dishonest or indifferent in the performance of required duties and studies, or whose character or conduct is inconsistent with good order of the veterinary college or with the standard of the veterinary profession.

Requirements for Graduation

To be eligible for the D.V.M. degree, candidates must complete all of the required courses in the order listed in the curriculum in veterinary medicine with a minimum overall grade-point average of 2.25. Following completion of all academic work, each student will be required to serve a preceptorship of one quarter with an approved practicing veterinarian. A certificate of satisfactory completion of a preceptorship will be required for graduation.

A graduation fee of \$15.00 must be paid at the beginning of the quarter of graduation and all indebtedness due the institution must be paid prior to graduation.

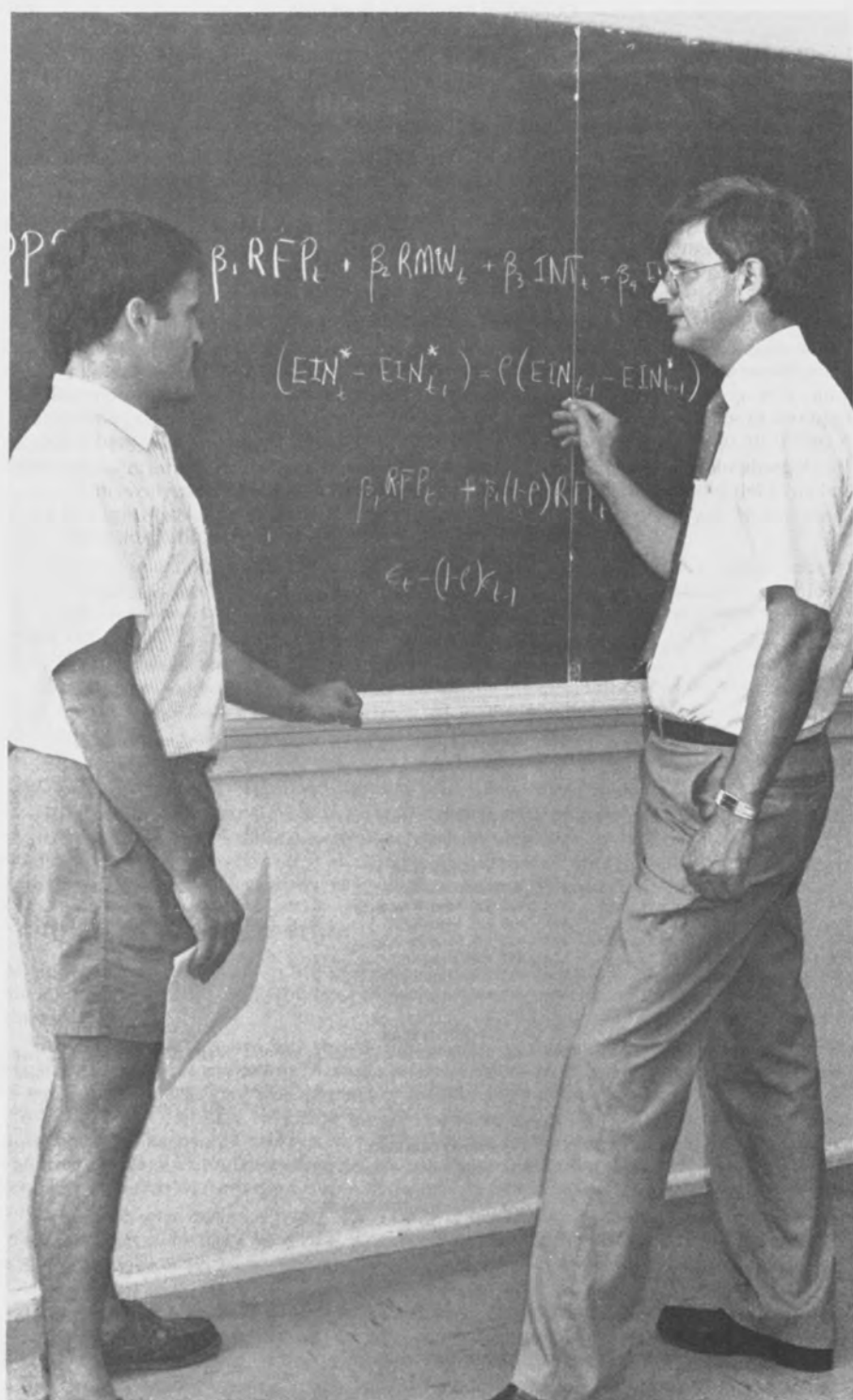
Curriculum in Veterinary Medicine (VM)

FIRST YEAR*		
First Quarter	Second Quarter	Third Quarter
VM 320 Anatomy I .....5	VM 321 Anatomy II .....5	VM 322 Anatomy III .....5
VM 326 Micro. Anat. I .....3	VM 327 Micro. Anat. II .....4	VM 328 Micro. Anat. III .....4
VM 313 Physiology I .....5	VM 314 Physiology II .....5	VM 315 Physiology III .....5
VM 300 Orientation .....2	VM 411 Microbiology II .....5	VM 412 Microbiology III .....5
VM 331 Microbiology I .....4		
SECOND YEAR*		
VM 405 Pathology I .....5	VM 406 Pathology II .....5	VM 423 Clinical Path. ....5
VM 413 Vet. Micro. IV .....5	VM 410 Vet. Parasitol. II .....4	VM 407 Pathology III .....4
VM 409 Vet. Parasitology I .....4	VM 401 Pharmacology II .....3	VM 427 S.A. Med. & Surg. I .....4
VM 319 Pharmacology I .....5	VM 432 Vet. Micro. V .....3	VM 402 Pharmacology III .....2
VM 429 S.A. Phys. Diagnosis .....1	VM 316 Physiology IV .....5	VM 428 L.A. Phys. Diag. ....2
		VM 421 Intr. to Surg. ....3
THIRD YEAR		
VM 420 L.A. Med. II .....5	PH 422 Avian Diseases .....4	VM 440 S.A. Clinics I .....6
VM 424 S.A. Med. & Surg. II .....6	VM 425 S.A. Med. & Surg. III .....5	VM 444 L.A. Clinics I .....7
VM 421 Intr. to Surg. ....3	VM 438 L.A. Med. III .....4	VM 435 Theriogenology .....5
VM 408 Lab. An. Med. ....3	VM 422 L.A. Surgery .....3	
VM 431 Vet. Radiology .....4	VM 451 Public Health I .....2	
VM 448 S.A. Surg. Pract. I .....2	VM 432 Vet. Mycology .....2	
	VM 449 S.A. Surg. Pract. II .....2	
FOURTH YEAR		
VM 437 Vet. Toxicology .....5	VM 442 S.A. Clinics III .....6	VM 443 S.A. Clinics IV .....6
VM 441 S.A. Clinics II .....6	VM 446 L.A. Clinics III .....7	VM 447 L.A. Clinics IV .....7
VM 445 L.A. Clinics II .....7	VM 439 L.A. Med. IV .....5	VM 430 Jurisp. & Ethics .....2
		VM 452 Public Health II .....2
SPRING QUARTER		
	VM 454 Preceptorship .....0	
TOTAL — 242 QUARTER HOURS		

* A phased curriculum revision was initiated in the fall of 1968.

Graduate Programs

Master of Science degrees are offered in each department in the College of Veterinary Medicine. The Doctor of Philosophy degree is offered in a college-wide program. Refer to the *Graduate School Bulletin* for further information.



The Graduate School

NORMAN J. DOORENBOS, *Associate Vice President for Academic Affairs
and Dean*

MICHAEL LISANO, *Assistant Dean*

A STUDENT with a bachelor's degree from an accredited college or university may apply to the Dean of the Graduate School for admission. Application forms for admission may be secured from the Graduate School and all materials must be submitted at least three weeks before registration.

The *Graduate School Bulletin* should be consulted for detailed information on the regulations of the Graduate School, the courses offered for graduate credit, the requirements for degrees, fellowships and assistantships, and other matters pertaining to graduate work in this institution. Undergraduates wishing to register for graduate courses should consult the *Graduate School Bulletin* for regulations concerning such registration. A bulletin may be obtained upon request from the Dean of the Graduate School.

Graduate Degrees

The Master's Program

Master of Science degrees are offered in the areas of Aerospace Engineering; Agricultural Economics and Rural Sociology; Agricultural Engineering; Agronomy and Soils; Anatomy and Histology; Algebra, Combinatorics, and Analysis; Animal and Dairy Sciences; Botany and Microbiology; Chemical Engineering; Chemistry; Civil Engineering; Communication Disorders; Computer Science and Engineering; Consumer Affairs; Counseling and Counseling Psychology; Education; Curriculum and Teaching; Economics; Educational Leadership; Educational Media; Electrical Engineering; Entomology; Family and Child Development; Fisheries and Allied Aquacultures; Forestry; Foundations, Analysis, and Topology; Geology; Health and Human Performance; Horticulture; Industrial Engineering; Large Animal Surgery and Medicine; Management; Manufacturing Systems Engineering; Materials Engineering; Mathematics; Mechanical Engineering; Microbiology; Nuclear Science; Nutrition; Nutrition and Foods; Ornamental Horticulture; Pathobiology; Pharmacal Sciences; Pharmacy Care Systems; Physics; Physiology; Physiology and Pharmacology; Plant Pathology; Poultry Science; Psychology; Radiology; Rehabilitation and Special Education; Small Animal Surgery and Medicine; Sociology; Toxicology; Vocational and Adult Education; Wildlife Science; and Zoology.

Master of Arts degrees are offered in the areas of English; French; History; Political Science; Sociology; Spanish; and Speech Communication.

Other Master's Degrees: Master of Accountancy, Master of Aerospace Engineering, Master of Agriculture, Master of Aquaculture, Master of Arts in College Teaching, Master of Business Administration, Master of Chemical Engineering, Master of Civil Engineering, Master of Communication Disorders, Master of Community Planning, Master of Education, Master of Electrical Engineering, Master of Fine Arts, Master of Forestry, Master of French Studies, Master of Hispanic Studies, Master of Industrial Design, Master of Industrial Engineering, Master of Manufacturing Systems Engineering, Master of Materials Engineering, Master of Mechanical Engineering, Master of Music, Master of Probability and Statistics, Master of Public Administration, Master of Speech Communication.

The Doctoral Degree Program

The Doctor of Education degree is offered in the departments of Counseling and Counseling Psychology, Curriculum and Teaching, Educational Foundations, Leadership and Technology, Health and Human Performance, Rehabilitation and Special Education, and Vocational and Adult Education.

The **Doctor of Philosophy** degree is offered in the areas of Aerospace Engineering, Agricultural Engineering, Agronomy and Soils, Algebra, Combinatorics, and Analysis, Animal and Dairy Sciences, Botany and Microbiology, Chemical Engineering, Chemistry, Civil

Engineering, Computer Science and Engineering, Counseling Psychology, Counselor Education, Electrical Engineering, English, Entomology, Family and Child Development, Fisheries and Allied Aquacultures, Forestry, Foundations, Analysis, and Topology, History, Industrial Engineering, Management, Materials Engineering, Mechanical Engineering, Physical Education, Physics, Plant Pathology, Poultry Science, Psychology, Wildlife Science, and Zoology and interdepartmental programs in Economics, Nutrition, Pharmaceutical Sciences, Physiology, and Veterinary Medicine.

Research Program with the ORAU

Auburn University is one of the sponsoring institutions of the Oak Ridge Associated Universities research program located at Oak Ridge, Tennessee. Through this cooperative association Auburn's graduate research programs have at their disposal the facilities of the National Laboratories in Oak Ridge and the research staffs of these laboratories.

Information on the opportunities for research in the Oak Ridge Laboratories is available in the office of the Vice President for Research.

Interdepartmental and Interdisciplinary Curricula

Undergraduate

Environmental Science (ENS)

THE CURRICULUM in Environmental Science is an interdepartmental program based on the strengths of Auburn University in the engineering, biological and physical sciences.

Environmental science specialists are employed by industries, consultants, trade associations, and by governmental agencies to work in areas such as hazardous materials management, environmental impact assessment, water supply, refuse and wastewater control, air pollution control, radiation health physics, industrial hygiene, institution sanitation, food sanitation, industrial safety, public health, and local, national, and global ecology.

The program leading to a Bachelor of Science degree is designed to prepare graduates for careers in the broad field of environmental science. Students desiring to incorporate an engineering or computer science base into this program are strongly encouraged to do so. For further details concerning the program, interested students should contact S. Rod Jenkins, P.E., Department of Civil Engineering (205-826-4321), Harbert Engineering Center.

Curriculum in Environmental Science

FRESHMAN YEAR			Third Quarter		
First Quarter			Second Quarter		
CH 103 Fund. Chem. & Lab.	5	CH 104 Fund. Chem. & Lab.	5	BI 101 Prin. Biol.	5
MH 160 Pre-Cal. w. Trig.	5	MH 161 An. Geom. & Cal.	5	CH 105 Fund. Chem. & Lab.	5
EH 101 English Comp.	3	EH 102 English Comp.	3	EH 103 English Comp.	3
HY 204 Tech. & Civiliz.	3	HY 205 Tech. & Civiliz.	3	HY 206 Tech. & Civiliz.	3
SOPHOMORE YEAR					
BI 107 Environm. Biol.	5	EC 200 Economics I.	5	AM 304 Meteorology.	5
PS 205 Physics	4	PS 206 Physics	4	PS 207 Physics	4
CH 203 Org. Chem.	5	SC 202 App. Sp. Comm.	5	RSY 362 Comm. Organiz.	5
NF 112 Nutrition & Man.	3	CH 204 Anal. Chem. & Lab.	5	BY 216 Intr. Bio. Comp.	3
JUNIOR YEAR					
PG 212 Psychology	5	ZY 251 Physiology	5	MT 344 Envir. Law	4
ZY 250 Human Anat.	5	EHA 304 Tech. Writing	3	ADS 220 Anim. Biochem. or	
BY 300 Gen. Microbiol.	5	PCS 563 Public Health	5	NF 318 Nut. Biochem.	5
AEC 210 Microcomputer App.	3	PO 327 Policy Process	5	CE 523 Envr. Hlth. Engrg.	3
				Elective.	3
				Prof. Elective.	4

SENIOR YEAR														
BST	501	Bio. Statistics	.....	5	BY	541	Environ. Microbiol.	.....	5	CE	490	Independent Study*	.....	5
IE	501	Safety Engr.	.....	3	CE	524	Air Pollution	.....	5	CE	420	Water Supply & Trmt. or		
		Prof. Elective	.....	6			Prof. Elective	.....	6	CE	421	Wastewater Trmt.	.....	4
CE	520	Env. Engr. Chem. I	.....	3	CE	521	Env. Engr. Chem. II	.....	3	PY	537	Fund. of		
CE	520	Env. Engr. Chem. II	.....	1								Bionucleonics	.....	3
												Prof. Elective	.....	6

TOTAL — 209 QUARTER HOURS

*An area of particular interest to the individual student can be selected for independent study, i.e. ADS 490, BY 460, CE 490, NF 408, PY 413, IE 490, etc.

Graduate

Interdepartmental Programs

The Graduate School offers four interdepartmental programs which lead to the Doctor of Philosophy degree: Economics, Nutrition, Physiology, and Veterinary Medicine. Students in the interdepartmental Sociology program may earn the Master of Arts, Master of Science, or Master of Arts in College Teaching degree. Students in Nutrition and Physiology may also earn the Master of Science degree. Departments and schools cooperating in the Nutrition program are: Animal and Dairy Sciences, Fisheries and Allied Aquacultures, Nutrition and Foods, Poultry Science, and the College of Veterinary Medicine. The faculty and students in Physiology are drawn from the departments of Animal and Dairy Sciences, Chemistry, Health and Human Performance, Pharmacy, Physics, Poultry Science, Psychology, Veterinary Physiology and Pharmacology, Veterinary Anatomy and Histology, and Zoology-Wildlife Science. The departments of Sociology and Anthropology and Agricultural Economics and Rural Sociology are the cooperating departments in Sociology.

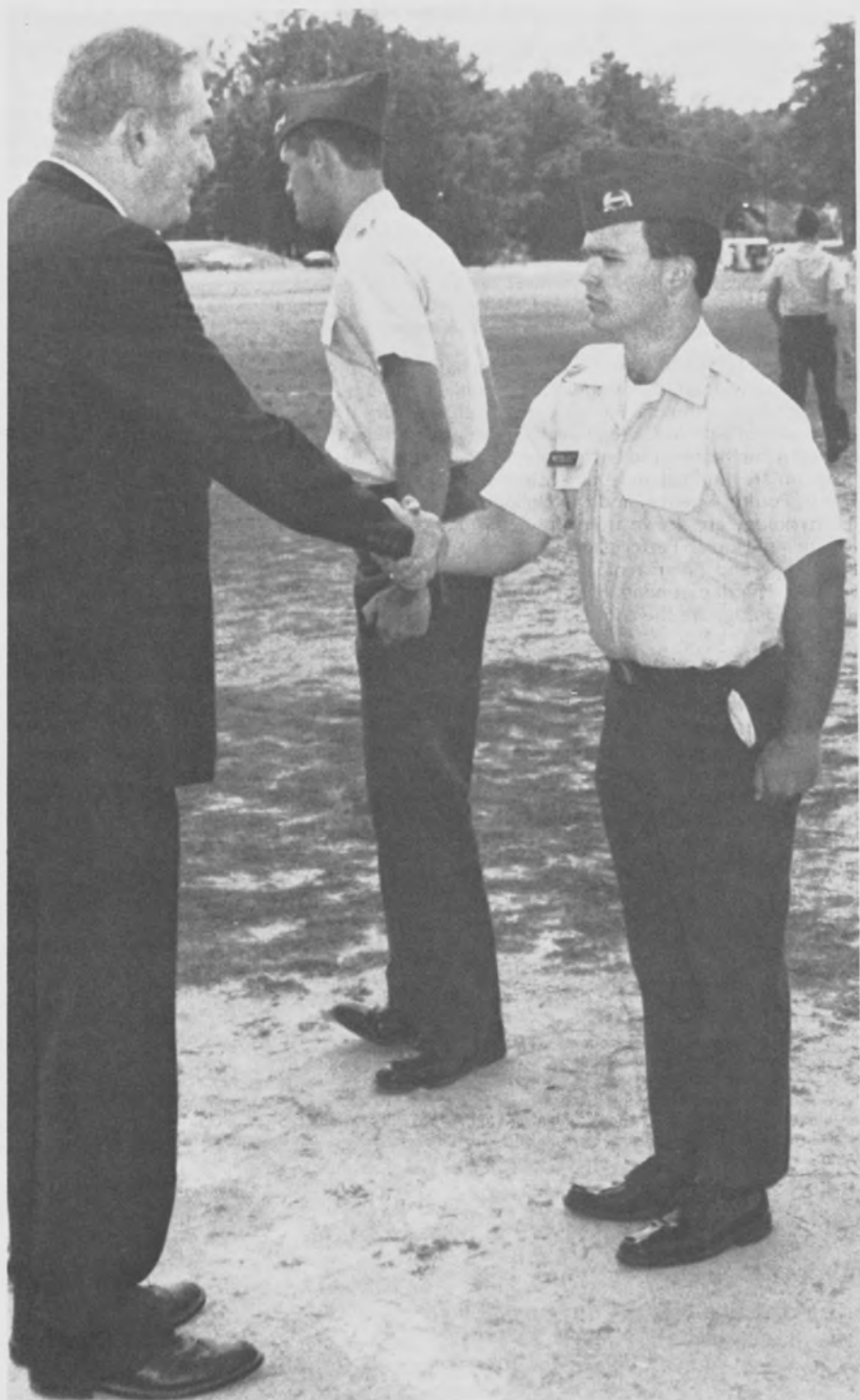
Certificate in Aging Studies

The Certificate in Aging Studies is a multidisciplinary program designed for students interested in problems of aging persons which will give them a general competency in gerontology. The career-oriented option complements a student's major field of study and, upon completion of the 25 hours, lead to a Certificate in Aging Studies. The program is open to all students who choose to use their elective hours in this manner. Interested students should contact the academic advisers in their School and the School of Human Sciences for further details concerning the program. The required courses (25 credit hours) and their prerequisites are as follows:

PG 302 Psych. Aspects of Death & Dying	3
*RSY 371 Applied Res. Meth. & Prog. Eval.	3
ZY 360 Physiology of Aging (Pr. BI 101)	3
FCD 477 Hum. Dev. V.: Family & Aging (Pr. FCD 270)	3
SY 477 Soc. of Aging (Pr. SY 201)	3
PG 507 Maturity & Aging (Pr. PG 212 or FCD 267)	5
FCD 497F Internship: Aging (Pr. FCD 287)	
or	
Special Problems Course offered in	
student's major department (must	
incorporate Aging Studies in some way)	5

*RSY 370 (5), Methods of Social Research or a statistics or research course required by the student's major area may be substituted. Credit will not be given for both RSY 371 and RSY 370 or SY 370.

NOTE: There are interdepartmental curricula offered in Computer Science and Computer Engineering. See College of Engineering section, page 109.



Reserve Officers Training Corps

Department of Military Science

COLONEL JOSEPH C. WINDLE

Professor of Military Science and Commander

THE PURPOSE of the Army ROTC program is to select, train, and motivate the future leadership of the active Army, Army National Guard, and Army Reserve. The initial ROTC courses serve to acquaint Auburn students with the Army and its role in our society, while the advanced ROTC courses prepare a student for service as a commissioned officer. The overall Army ROTC curriculum prepares students to become effective leaders and managers in a variety of challenging fields.

The curriculum is divided into two courses; a General Military Course open to all freshmen and sophomores and an Officer Development Course for qualified juniors, seniors, and graduate students. Successful completion of both courses and award of a bachelor's degree constitute the normal progression to gaining a commission as a Second Lieutenant. Courses are available to both men and women students.

Students undecided about pursuing commissions may keep this option open by participating in the General Military Course together with their chosen curriculum. This provides freshmen and sophomores the opportunity to make an educated decision on the advantages of gaining an officer's commission while incurring no military obligation. Successful completion of the General Military Course or commensurate training, a minimum 2.0 grade point average and medical qualifications are prerequisites for enrollment in the Officer Development Course.

GENERAL MILITARY COURSE

Basic Program — The Basic Military Science courses enrich the freshman and sophomore students' courses of study and count toward their graduation requirements. Completing these courses also opens up an additional career option, enabling them to participate in advanced studies toward award of an officer's commission. Subsequently, they may gain either active service or service in the National Guard or Reserves while pursuing their civilian career choices.

The basic program consists of a six-quarter block of instruction taken during the freshman and sophomore years. Successful completion of MS 101, 102, 103, plus MS 201, 202, 203, together with leadership lab each quarter, satisfies the academic requirements for progression to the Officer Development Course. Two credit hours per quarter are earned in each of the courses. Approval may be obtained to allow completion of all six courses within one academic year.

Curriculum In The General Military Course (MS I/MS II) (Basic Program)

MS 101 The U.S. Army Today**
MS 102 Contemp. Military Issues**
MS 103 Modern Military Weapons
and Operations**

MS 201 Military Power and National Security**
MS 202 Map Reading & Troop Leading Procedures**
MS 203 Leadership and Management**

Other MS courses provide unique hands-on training in mountaineering, tactics, wilderness skills, and marksmanship. The Professor of Military Science may grant basic program credit for completion of these hands-on training courses. Selected courses are offered Fall, Winter, and Spring Quarters with two credit hours earned for each course. Elective credits apply toward degree requirements in all schools of the University. The following five courses are available for Elective credit:

MS 104 Mountaineering
MS 105 Pistol Marksmanship
MS 139 Wilderness Skills

MS 162 Rifle Marksmanship
MS 305 Ranger Operations*

*Different Instruction is offered each quarter.

**Includes Leadership Lab.

Optional Basic Camp

Those academically qualified students who are unable to fulfill the requirements of the Basic Program during their freshman and sophomore years may qualify themselves for admission to the Officer Development Course by successfully completing Basic Camp preparatory training. The basic camp option consists of a six-week training period conducted at an active Army post during the summer months. Students desiring to exercise this option are required to submit a formal application and pass a general physical.

Students electing the basic camp training program will receive approximately \$650.00 in addition to travel expenses to and from camp. Uniforms, housing, medical care, and meals are furnished by the government during the camp.

Deadline for applications is 15 May. Interested students should contact the Military Science Department at the start of Spring Quarter.

OFFICER DEVELOPMENT COURSE

Advanced Program — The Advanced Program is designed to develop fully a candidate's leadership and management potential, physical stamina, and poise, as well as those personal characteristics desired in an Army Officer. The program's objective is to produce the highest caliber junior officer fully capable of command and management responsibilities in the modern Army and the business world.

The Officer Development Course consists of a six-quarter block of instruction taken during the junior and senior years. Successful completion of six courses together with leadership laboratory each quarter fulfills military science academic requirements for award of an officer's commission. Four credit hours per quarter are earned in each of the courses. Students receive a subsistence allowance of \$100.00 a month (tax free) not to exceed \$1000.00 per academic year, while enrolled.

Service veterans, junior or military college transfers, members of the National Guard or Army Reserve, and former military academy cadets may qualify for direct entry into the Officer Development Course.

Advanced program students are eligible to participate in the Simultaneous Membership Program with the Army National Guard or Army Reserve. Students participating in this program affiliate with an Army unit as a student officer thus affording them the opportunity for enhanced leadership development. Students in this program receive an additional \$125.00 per month.

Students enrolled in the Officer Development Course are also required to complete successfully a six-week Advanced Camp at Fort Riley, Kansas, during the summer to become eligible for commissioning. Attendance at Advanced Camp normally occurs in the summer between the junior and senior years. The purpose of Advanced Camp training is to provide each candidate hands-on experience in leadership development positions as well as extensive training in military tactics, techniques, and related subjects vital to success as a junior officer. Students attending Advanced Camp receive approximately \$825.00 in addition to travel expenses to and from Fort Riley. Uniforms, housing, medical care, and meals are furnished by the government during the camp.

Additional voluntary training at one or more of a variety of active Army service schools is available to selected students during the summer. Students may select attendance at Ranger School, Airborne School, Air Assault School, The Northern Warfare Training Center, and Cadet Troop Leadership Training. Students who successfully complete the appropriate course are authorized to wear the coveted Ranger Tab, Parachutist Badge, or Air Assault Badge.

Students who successfully complete the Army ROTC curriculum and who gain a bachelor's degree serve on active duty or with the Army National Guard or Army Reserve. Outstanding candidates who are selected as Distinguished Military Students may gain Regular Army commissions. Active duty is for a period of three years with the opportunity for quality officers to apply for extended service. Current salary for a married Second Lieutenant is \$21,601.00. Medical and other benefits are also provided at no cost. The following courses constitute the Advanced Program.

Curriculum In The Officer Development Course (MS III/IV) (Advanced Program)

MS	301	Land Navigation Techniques**
MS	302	Military Training and Instruction Techniques**
MS	303	Military Qualification Skills**
MS	401	Military Justice and Ethics**
MS	402	Advanced Leadership and Management I**
MS	403	Advanced Military Leadership and Management II**
MS	404	Leadership Laboratory

**Includes Leadership Lab and physical conditioning three days a week.

Professional Military Education Requirements

All Army ROTC cadets are required to complete one quarter of selected undergraduate courses in five designated fields of study prior to graduation. In addition, scholarship cadets are required to complete successfully one quarter of a foreign language course. The fields of study and approved courses are:

Written Communication Skills: EH 101, 102, 103, 393, IN 301, 322, EHA 304, 307, 315, PA 111

Humanities: PA 202, 214, 222, PG 211, 212, SY 201, ANT 203

Military History — HY 309*

Computer Literacy: CSE 100, MN 207*

Math Reasoning: MH 140, 161, PA 211, 212*

Foreign Language**

*Alternate course may be taken with PMS approval.

**Required only for scholarship cadets.

Scholarship Programs

Each year the Army offers a variety of full scholarship programs to those young men and women who have demonstrated outstanding academic scholarship and leadership potential. Four-year scholarships are awarded incoming freshmen through national merit competition. Three-year and two-year scholarships are available on either a national competitive basis or directly through the Professor of Military Science. Scholarships provide full tuition to both resident and out-of-state students, textbooks, materials and laboratory fees in addition to a \$100 a month tax free allowance. Scholarship students may also receive SMP benefits upon entering the Advanced Course.

Army Nurse Corps Option

Students enrolled in the School of Nursing curriculum leading to the degree of Bachelor of Science in Nursing may simultaneously qualify for commissions as Second Lieutenants in the Army Nurse Corps.

Nursing students qualify for entry into the Officer Development Course through satisfactory completion of either the General Military Course, the Basic Camp option, or equivalent training.

Nursing students also participate in either the six-week summer Advanced Camp training or an alternate Army nurse training program. The alternate advanced training is a voluntary six-week program for nursing students at selected medical treatment facilities throughout the United States. It is structured to provide practical and leadership experience in the clinical setting. Primary focus is directed at providing nursing cadets an experience which integrates clinical, interpersonal, and leadership knowledge and skills. Emphasis is placed on practical experience under the direct supervision of an Army Nurse Corps Officer who acts as the cadet's preceptor throughout the camp period.

Department of Naval Science

CAPTAIN RICHARD H. PHELAN, USN

Commanding Officer and Professor of Naval Science

THE MISSION OF NROTC is to develop Midshipmen morally, mentally, and physically and to commission college graduates as Naval Officers who possess a basic professional potential for future development in mind and character so as to assume the highest responsibilities of command, citizenship, and government. All NROTC Programs are open to qualified women students. All Naval Science courses, basic and advanced, are open to all Auburn students regardless of affiliation with the NROTC Program.

TYPES OF NROTC PROGRAMS

1. NROTC Navy-Marine Scholarship Program. Successful completion leads to commission in regular Navy or Marine Corps. Minimum active duty service is four years.

Tuition, fees, and all textbooks are paid for by the Government. Subsistence pay is \$100 per month for a maximum of 40 months. Active duty pay for summer training is approximately \$480 per month.

Although the Navy emphasizes engineering and science majors, students may take most Auburn University majors leading to baccalaureate degrees. In addition to the requirements of their major, NROTC students are required to complete 29 quarter hours of Naval Science. Summer quarters are served on two at-sea training cruises and one summer period of career orientation, lasting from four to eight weeks each. Marine Option students participate in a 6-week orientation at Quantico, VA in lieu of the second at-sea training cruise.

Entrance to the Navy-Marine Scholarship Program is via nationwide competition. Applicants must make independent arrangements to take either the Scholastic Aptitude Test or the American College Test.

Scholarship students may resign without obligation any time prior to the beginning of the second year in the Program.

2. Four-Year NROTC Navy-Marine College Program. Leads to a commission in the Navy or Marine Corps Reserve. Subsistence pay is \$100 per month for a maximum of 20 months during the final two years of training. Minimum active duty service is three years. These students are selected by the Professor of Naval Science after application for the College Program.

Four-year College Program students who have not received any \$100 per month subsistence payments may resign from the Program without obligation.

3. Two-Year NROTC Navy-Marine Scholarship Program. Selections for this Program are made on a national basis from nominations submitted by the Professors of Naval Science. Selected applicants attend the Naval Science Institute (NSI) for six weeks during the summer prior to the junior year. Successful NSI completion qualifies students for enrollment in the advanced course of the NROTC Program.

Students in both the latter programs may apply for the Scholarship Program through nomination by the Professor of Naval Science for appointment by the Chief of Naval Education and Training as Scholarship students.

College Program students must complete Naval Science requirements prior to or concurrently with receipt of a baccalaureate degree. Summer training consists of at-sea training cruise between junior and senior years. Students desiring commissions in the Marine Corps will participate in a 6-week orientation at Quantico, VA in lieu of at-sea training.

Qualifications for enrollment, application blanks, and information bulletins are available at high schools, colleges, recruiting stations, and the Auburn NROTC Unit.

Equipment

Uniforms, Naval Science textbooks, and equipment necessary for the NROTC Program are furnished in all three programs.

Curriculum

The Naval Science curriculum consists of the following hours per week: Freshmen, four hours; Sophomores, five hours; Navy Option Juniors, six hours; Marine Option Juniors, five hours; Seniors, five hours.

Naval Science subjects carried during the four-year curriculum are listed in the Description of Courses section of this Bulletin. Only 300/400 series subjects are applicable to the Two-Year Program.

Naval Science course hours are considered as part of the normal quarterly loads; however, Auburn University graduation requirements are increased 11 to 17 hours, depending upon the College or School in which the student is enrolled, over the number of hours listed in the University Catalog. Navy Option Scholarship students must also complete calculus and physics courses.

Department of Air Force Aerospace Studies (AFROTC)

COLONEL RALPH D. LEBLANC

Commander and Professor of Aerospace Studies

AFROTC is the nation's largest source of Air Force Officers. It provides a basic understanding of the role of air power, leadership and management in the Air Force. Enrollment in the General Military Course is open to all freshman and sophomore men and women and does not require a military commitment. The Professional Officer Course is open to qualified junior and senior men and women and leads directly to an Air Force commission.

General Military Course (GMC)

Basic Course -- The General Military Course comprises one class hour and one Leadership Laboratory hour per week. One credit hour is allowed for each quarter of the six quarter basic course. Up to six credit hours may be applied toward the total credits required for graduation. Leadership Laboratory includes instruction in drill and ceremonies and briefings by various Air Force commands and staff agencies. Students are provided the opportunity to visit various Air Force bases to acquaint them with operational Air Force units.

Curriculum in the General Military Course

AF 101/2/3 The Air Force Today

AF 201/2/3 The Development of Air Power

Professional Officer Course (POC)

Advanced Course — The Professional Officer Course consists of a six-quarter course series normally taken during the junior and senior years. Enrollment in the advanced course is also open to graduate students if they have six-quarters of school remaining. Three classroom hours of instruction and one hour of Leadership Laboratory are taken per week. Three credit hours per quarter or a total of 18 credit hours are granted for completion of the Professional Officer Course; however, only six to 12 credit hours may be applied toward the total credits required for graduation. Students enrolled in the program are given a monthly subsistence allowance of \$100.00. All POC cadets must complete a course in mathematics reasoning.

Curriculum in the Professional Officer Course

AF 301/2/3 Air Force Management and Leadership

AF 401/2/3 National Security Forces in Contemporary American Society.

Field Training Course

Applicants for the Professional Officer Course attend a summer Field Training Course between their sophomore and junior years. The Air Force furnishes uniforms, housing, medical care, insurance, rations, a round trip travel allowance and military pay at field training. Students attend a four week course if they have completed the GMC or equivalent.

If a student has no previous military training, a six week field training is mandatory before POC entry.

College Scholarship Program (CSP)

Four, three and one-half, three, two and one-half, and two year Air Force ROTC scholarships are available for male and female students who qualify. Scholarships provide full tuition, laboratory expenses and incidental fees, textbooks, \$100.00 a month personal allowance (tax free), and all uniform items. Scholarships are awarded to qualified students based on application to, and selection by national selection boards. Scholarship students with little or no previous foreign language training or experience must complete at least two quarters of a major Indo-European or Asian language. In addition, all CSP cadets must complete one quarter of English Composition.

Light Aircraft Training (LATR)

Light Aircraft Training is conducted at the completion of the cadets' Field Training course or between the junior and senior years. It provides the pilot category cadets with 14 hours of flight training and serves as a screening program to insure that the student has the aptitude and motivation for a career as an Air Force pilot. LATR is at no expense to the cadet and is provided by a private contractor monitored by USAF personnel.

Courses of Instruction

THIS SECTION lists and describes all courses taught by the departments of the University. The courses are presented by subjects, arranged alphabetically. The subject name (the heading in large type) is followed by the departmental symbol in parentheses. Below the subject appears a list of the departmental faculty.

The subject name (symbol) together with the course number constitutes the official designation for the course for purposes of registration and official records. The specific course title appears in boldface following the course number. The figures in parentheses denote the number of quarter hours of credit for the course. Following the credit hours are listed lecture and laboratory clock hours, if applicable. If none is listed, the course consists of lecture hours equal in number to course credit. Next appear the prerequisites, if applicable.

Courses are numbered according to the following system:

- 101-199** Courses primarily for freshmen.
- 201-299** Courses primarily for sophomores.
- 301-399** Courses primarily for juniors.
- 401-499** Courses primarily for seniors. Not open to graduate students.
- 501-599** Courses for advanced undergraduate and graduate students; and for fifth year students in professional curricula. **Junior Standing Required For Enrollment At This Level.**
- 601-799** Courses for graduate students.

INDEX BY FIELDS OF INSTRUCTION

(Departmental symbols in parentheses)

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Aerospace Engineering (AE)	202	Educational Foundations, Leadership, and Technology (EFLT)	261
Aerospace Studies (AF)	205	Educational Media (EM)	263
Agricultural Economics (AEC) and Rural Sociology (RSY)	206	Electrical Engineering (EE)	266
Agricultural Engineering (AN)	209	Engineering (EGR)	271
Agronomy and Soils (AY)	211	English (EH)	272
Anatomy and Histology (VAH)	381	Entomology (ENT)	275
Animal and Dairy Sciences (ADS)	213	Environmental Science	277
Anthropology (ANT)	370	Family and Child Development (FCD)	277
Architecture (AR)	215	Finance (FI)	279
Art (AT)	219	Fisheries and Allied Aquacultures (FAA)	280
Aviation Management (AM)	222	Food Science (FS)	283
Biological Statistics (BST)	227	Foreign Languages (FL)	283
Biology (BI)	224	Forest Engineering (FYE)	291
Botany and Microbiology (BY)	224	Forest Management (FY)	292
Building Science (BSC)	228	Forest Products (FP)	294
Chemical Engineering (CHE)	229	Foundations of Education (FED)	264
Chemistry (CH)	231	Geography (GY)	296
Civil Engineering (CE)	234	Geology (GL)	297
Communication Disorders (CD)	240	Health Administration (HA)	300
Community Planning (CP)	218	Health and Human Performance (HHP)	300
Computer Science & Engineering	242	History (HY)	306
Consumer Affairs (CA)	245	Horticulture (HF)	309
Counseling and Counseling Psychology (CCP)	249	Industrial Design (IND)	311

Industrial Engineering (IE)	312	Pharmaceutical Sciences (PY)	345
Interdepartmental Education (IED)	317	Pharmacy Care Systems (PCS)	347
Interior Design (ID)	217	Pharmacy Practice, Clinical (PC)	349
Journalism (JM)	317	Philosophy (PA)	350
Laboratory Technology (LT)	318	Physical Science (PHS)	352
Large Animal Surgery and Medicine (VLA)	382	Physics (PS)	352
Landscape Architecture (LA)	217	Physiology and Pharmacology (VPH)	384
Law Enforcement (LE)	318	Plant Pathology (PLP)	355
Management (MN)	319	Political Science (PO)	356
Marketing and Transportation (MT)	322	Poultry Science (PH)	359
Materials Engineering (MTL)	324	Psychology (PG)	361
Mathematics (MH)	326	Radiology (VR)	385
Mathematics-Algebra, Combinatorics and Analysis (MHC)	328	Rehabilitation & Special Education (RSE)	364
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Mechanical Engineering (ME)	333	Rural Sociology (RSY)	370
Military Science (MS)	336	Small Animal Surgery and Medicine (VSA)	385
Music (MU)	337	Social Work (SW)	371
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Naval Science (NS)	341	Speech Communication (SC)	372
Nursing (NUR)	341	Textile Engineering (TE)	375
Nutrition (NN)	342	Theatre (TH)	377
Nutrition and Foods (NF)	343	Veterinary Medicine (VM)	379
Pathobiology (VPB)	382	Vocational and Adult Education (VED)	386
		Zoology-Wildlife Science (ZY)	390

Note: COI Is Used For Consent Of Instructor In Course Description Headings.

University Courses (U)

The following courses, interdisciplinary and experimental in character, enable students to see in a wide perspective the relationship of individual courses in his curriculum and to understand more fully the dominant ideas and concepts confronting him in the modern world. University Courses are open to students in all curricula.

105. **INTRODUCTION TO THE ARTS (3).** An introduction to the processes involved in creating, understanding and appreciating the arts, including architecture, visual and plastic arts, dance, music and theatre. Administered by Department of Theatre.
135. **COMPUTER LITERACY (2).** Comprehensive overview of computers, computer science terminology, and computer applications and utilization in work and home settings. This course cannot be applied toward graduation from the College of Business.
190. **THEORY AND PRACTICUM IN COLLEGIATE SPORTS (1).** Conditioning activities in preparation for competitive football. Skills and fundamental techniques of physical activities related to football. Coaching techniques applicable to all areas of athletic competition. S-U graded.
201. **FORUM (1).** May be taken more than one quarter for a maximum of 3 credits. S-U only. Credit is given in recognition of significant attendance at public academic lectures, concerts, and other events. Requires attendance at seven of the 15-20 FORUM-designated events, which are chosen from various University lecture and concert series and departmental programs. Administered by Department of Political Science.
- 270-271-272. **ASCENT OF MAN (3). LEC. 2, LAB. 1.** Based on the films and text prepared by Jacob Bronowski, the course deals with the historic interaction between science and culture. Students view each week one film segment in the *Ascent of Man* series, with subsequent small-group classroom sessions devoted to discussion of the film and auxiliary readings.
275. **INTERPERSONAL RELATIONS (3).** A multi-disciplinary study of methods used by human beings in their interactions that tend to be mutually rewarding. Emphasis is on practical applications within the context of the student's present fields of study and projected fields of work.
277. **HONORS LYCEUM (1).** Pr., membership in University Honors Program. May be repeated for a maximum of 6 credits. S-U only. Weekly academic lectures followed by discussion and interaction.
305. **THE MODEL UNITED NATIONS (1).** May be taken more than one quarter for a maximum of 3 credits. S-U only. Preparation of materials for, and active participation in, the sessions of the Model United Nations program held annually on the campus. Administered by Department of Political Science.

399. **EXPERIENTIAL LEARNING (2-6).** Pr., sophomore standing and COI. May be repeated once for credit. A maximum of 6 credits allowed. Students may obtain academic credit for participation in learning experiences of a practical nature available outside the normal curricular offerings of the University. Normally S-U Graded.

Accountancy (AC)

Professors Rouse, *Director*, Alderman, and Thorne

Associate Professors Criss, Dinius, Fields, Tabor, and Worthington

Assistant Professors Beard, Colbert, Crowell, Minyard, Price, Weld, and Wilson

Instructors Butts, Cook, Ellis, Evans, Guthrie, Haygood, Parker, and Taylor

Effective Fall Quarter 1990, a 2.0 GPA will be required for environment in any Business course at the 300-level or above. This rule will apply to both Business and non-Business students.

211. **PRINCIPLES OF ACCOUNTING I (4).** LEC. 4, LAB. 1. Pr., sophomore standing. Basic accounting principles, including the accounting cycle and preparation of financial statements. AC 211 is not open to students with credit in AC 215.
212. **PRINCIPLES OF ACCOUNTING II (4).** LEC. 4, LAB. 1. Pr., AC 211. A continuation of accounting principles with emphasis on their application to partnerships, corporations, and preparation and analysis of various financial statements.
213. **MANAGERIAL COST AND BUDGETING (4).** LEC. 4, LAB. 1. Pr., AC 212 and non-Accounting major. Introductory cost accounting and budgeting with some emphasis on distribution costs and managerial accounting problems.
215. **FUNDAMENTALS OF GENERAL AND COST ACCOUNTING (5).** LEC. 4, LAB. 1. Pr., sophomore standing. Fundamental concepts and principles of general and cost accounting. Emphasis on accumulating, reporting, and interpreting cost data in the production area of business operations. (Not open to undergraduates majoring in Business. Credit in AC 211 precludes credit for AC 215.)
311. **INTERMEDIATE ACCOUNTING I (5).** Pr., AC 212 and junior standing. Accounting principles and theory, including a review of the accounting cycle and accounting for current assets, current liabilities, and investments.
312. **INTERMEDIATE ACCOUNTING II (5).** Pr., AC 311 with a grade of C or better. A continuation of accounting principles and theory with emphasis on accounting for fixed assets, intangibles, corporate capital structure, long term liabilities, and investments.
313. **INTERMEDIATE ACCOUNTING III (5).** Pr., AC 312 with a grade of C or better. A continuation of accounting principles and theory with emphasis on pension costs, leases, analysis of financial statements, and funds flow, segment reporting, and interim reporting.
314. **INCOME TAX ACCOUNTING (5).** Pr., AC 311. Interpretation of the regulations, preparation of returns, and the keeping of accounting records for tax purposes.
319. **BUSINESS LAW FOR ACCOUNTANTS (5).** Pr., AC 312. Business law applied to the environment and applications of accountancy.
400. **STUDENT INTERNSHIP PROGRAM (1-10).** Pr., junior standing and selection by the faculty committee.
410. **COST ACCOUNTING (5).** Pr., AC 311 or COI and junior standing. Accounting principles and procedures involved in job-order, process, and standard cost accounting.
416. **AUDITING I (5).** Pr., AC 313 and senior standing. The principles of auditing including auditing standards, ethics, legal liability, objectives, controls, evidence, planning, sampling concepts, credit reports, audit reports, and other reports.
420. **COMPUTERIZED ACCOUNTING SYSTEMS AND AUDIT APPLICATIONS (5).** Pr., AC 416 and senior standing. The design of computerized accounting information systems and the application of audit procedures to accounting information. Also includes the application of statistical sampling and generalized audit software packages.
470. **HONORS THESIS (1-6).** Pr., open only to persons in the University Honors Program and with consent of the student's Honors Adviser.
490. **SPECIAL PROBLEMS. (1-10).** Pr., AC 313 and senior standing. Advanced individual research and study of accountancy under guidance of a faculty member.
491. **VETERINARY BUSINESS METHODS (3).** LEC. 3, LAB. 1. Pr., 4th yr. Summer. Various aspects of business methods and legal concerns in starting a veterinary practice. Emphasis on accounting systems, record keeping procedures and taxation.
499. **SEMINAR IN CURRENT ACCOUNTING TOPICS (1).** Pr., graduating seniors. The current literature, problems, and controversies affecting the accounting profession.

ADVANCED UNDERGRADUATE AND GRADUATE

511. **FINANCIAL ACCOUNTING THEORY (5).** Pr., AC 313. An evaluation, critique, and application of financial accounting theory to current reporting problems.
514. **ADVANCED INCOME TAX ACCOUNTING (5).** Pr., AC 313, 314 and senior standing. Special tax accounting problems of individuals, partnerships, corporations, estates, and trusts. Extensive use will be made of a tax service program.
516. **AUDITING II (5).** Pr., AC 416. An in-depth study of specialized auditing topics including statistical sampling and computer auditing.

517. **ADVANCED MANAGERIAL AND COST ACCOUNTING** (5). Pr., AC 313, 410, and senior standing. Specialized managerial and cost accounting problems, including application of quantitative methods.
518. **ADVANCED ACCOUNTING** (5). Pr., AC 313 and senior standing. Accounting for business combinations, foreign operations, and governmental accounting.
519. **GOVERNMENTAL AND NON-PROFIT ACCOUNTING** (5). Pr., AC 313. Budgeting and accounting procedures of governmental divisions.
584. **SEMINAR IN TAX FACTORS IN MANAGEMENT DECISIONS** (5). Pr., MN 480, MN 480 concurrently or AC 610. Primarily non-technical. Study of tax consequences apt to attach to common business transactions.

GRADUATE

610. **MANAGERIAL ACCOUNTING** (5). Pr., AC 613 or equivalent and, for non-business students, consent of director of the MBA Program. Application of fundamental accounting concepts and introduction to cost managerial concepts with a focus on current problems in decision-making, planning, and control.
611. **ADVANCED ACCOUNTING THEORY** (5). Pr., AC 313. A review of the origin and development of double-entry accounting; followed by a critical study of the theory of modern accounting principles and procedures.
613. **FOUNDATIONS IN ACCOUNTING FOR MANAGEMENT** (3). Pr., MH 140 and, for non-business students, consent of director of the MBA Program. An accelerated course in accounting fundamentals and business applications.
614. **RESEARCH IN FEDERAL TAXATION** (5). Pr., AC 514. Analysis of federal taxation problems and relationships among code provisions, generally accepted accounting principles, and business decisions.
615. **FINANCIAL INFORMATION SYSTEMS** (5). Pr., AC 313 or COI. Identification, evaluation, and modification of critical information flows into efficient and effective information systems to service modern management decision needs.
616. **ADVANCED AUDITING** (5). Pr., AC 416. Application of auditing principles and procedures to practical problems in public and private accounting.
617. **ADVANCED ACCOUNTING PROBLEMS** (5). Pr., AC 611 or COI. An extension and a consolidation of all the other advanced accounting courses. Preparation for special accounting examinations.
618. **ADVANCED FINANCIAL REPORTING** (5). Pr., AC 611 and AC 616, or COI. An indepth study of current financial reporting problems and the resolution of such problems in accordance with professional standards relating to financial reporting.
621. **DEVELOPMENT OF ACCOUNTING THOUGHT** (5). Pr., AC 313. The origin and development of accounting theories and concepts.
630. **RESEARCH FEDERAL TAXATION** (5). Pr., AC 514. Extensive study and application of sources of authority used in federal tax research. Also, tax policy issues are surveyed.
631. **FEDERAL TAXATION OF CORPORATIONS** (5). Pr., AC 630 or COI. Analysis of the federal taxation of corporations and their shareholders, including the tax treatment of corporate organization, distributions, liquidations, accumulations, and reorganizations.
632. **FEDERAL INCOME TAXATION OF PARTNERSHIPS** (5). Pr., AC 614. Analysis of the tax problems of the organization and operation of partnerships including the treatment of partnership distributions, withdrawal of a partner during his lifetime, death of a partner, dissolution of the partnership, sales or exchanges of partnership interests, limited partnerships, and special problems of family partnerships.
633. **FEDERAL ESTATE AND GIFT TAXATION** (5). Pr., AC 630 or COI. Analysis of the federal taxation of estates and gifts including determination and evaluation of items included in a decedent's gross estate, identification of transfers subject to the gift tax, and federal tax treatment of generation-skipping transfers.
634. **CURRENT TOPICS ON FEDERAL TAXATION** (5). Pr., AC 614. An intensive study and analysis of statutory, administrative, and judicial developments in taxation and their implications for tax planning.
650. **SEMINAR (1-10)**. Pr., COI. Intensive study and analysis of accounting problems.
681. **DETERMINISTIC QUANTITATIVE METHODS IN ACCOUNTING** (3). Pr., MN 604 or equivalent and for non-business students, consent of Director of the MBA Program, College of Business. Deterministic quantitative methods for business applications.
682. **STOCHASTIC QUANTITATIVE METHODS IN ACCOUNTING** (3). Pr., MN 604 or equivalent and for non-business students, consent of Director of the MBA Program, College of Business. Various quantitative methods applied to decision-making under conditions of risk and uncertainty.
690. **SPECIAL PROBLEMS (1-15)**. Pr., COI. Variable content in the accounting areas.
699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)**

Aerospace Engineering (AE)

Professors Williams, *Head*, Cochran, and Cutchins
Associate Professors Burkhalter, Foster, Nichols, and Spring
Assistant Professors Cicci, Gross, Innocenti, and Jenkins

General Curriculum, GC, students (those with undeclared major) may enroll only with departmental consent.

203. **AEROSPACE FUNDAMENTALS** (3). LEC. 2, LAB. 3. Pr., MH 161. Aerospace concepts and terminology. General schemes and designs of aerospace systems and applications of computers to same. Duplicate credit will not be given for AE 203 and similar courses which include FORTRAN programming instruction.

300. **AEROSPACE ANALYSIS I (3).** Pr., MH 264. Special methods and notations used in Aerospace Engineering.
302. **AIRLOADS (4).** LEC. 3, LAB. 3. Pr., ME 340. Coreq., AE 303. Application of the basic equations of fluid dynamics to the prediction of pressure distribution, wing loading and hinge moments. Propeller design and selection.
303. **THEORETICAL AERODYNAMICS I (4).** Pr., ME 340 and AE 300. Coreq., AE 302. Fundamental analysis of aerodynamics and potential flow theory. Correlation of potential flow theory with experimental results.
304. **THEORETICAL AERODYNAMICS II (4).** LEC. 3, LAB. 3. Pr., AE 303. Fundamental principles of compressible flow including subsonic, transonic, supersonic, and hypersonic aerodynamics. High speed wind tunnels and laboratory techniques.
305. **FLIGHT PERFORMANCE (3).** Pr., AE 302. Equations of motion and solution techniques for vehicle performance analysis including effects of propulsion system and aerodynamic variations.
307. **AEROSPACE STRUCTURES I (5).** LEC. 4, LAB. 3. Pr., ME 207. Basic structural analysis. Shear and bending in monocoque structures. Deflections of beams and frames. Column and plate buckling. The laboratory portion is devoted to experimental techniques in stress analysis.
310. **AEROSPACE ANALYSIS II (4).** Pr., MH 265, ME 321. Linear and non-linear systems, linearization procedures, and linear systems analysis techniques. Other special techniques as required by advanced courses.
311. **AEROSPACE MATERIALS AND METHODS OF CONSTRUCTION (2).** Pr., AE 307. Nomenclature, coding systems, physical and structural properties, applications and fabrication techniques as applied to aerospace materials.
326. **FUNDAMENTALS OF AEROSPACE DYNAMICS (3).** Pr., AE 310. Dynamics of aerospace vehicles in moving reference frames; Eulerian formulation for the vehicle as a rigid body; Lagrangian formulation and small oscillation theory. Provides a unified basis for further studies in aircraft vibration, flight dynamics, and space flight mechanics.
400. **VISCOUS AERODYNAMICS (4).** LEC. 3, LAB. 3. Pr., AE 304. Theoretical background essential to a fundamental understanding of laminar and turbulent boundary layers and their relations to skin friction and heat transfer. Experimental techniques.
409. **AEROSPACE STRUCTURES II (5).** LEC. 4, LAB. 3. Pr., AE 203 or equivalent knowledge of FORTRAN programming, AE 307, 310. A continuation of AE 307. An introduction to the finite element method. The laboratory portion is devoted to the solution of structural problems on the digital computer.
415. **JET PROPULSION (5).** LEC. 4, LAB. 3. Pr., AE 304. Internal aerodynamics and thermodynamics of rockets and air-breathing jet engines. Jet nozzles. Detailed analysis of flow through turbojet compressors, combustors and turbines.
432. **ASTRODYNAMICS I (3).** Pr., AE 326 or COI. Geometry of the solar system, detailed analysis of two-body dynamics and introduction to artificial satellite orbits; Hohmann transfer and patched conics for lunar and interplanetary trajectories. Elements of orbit determination.
434. **AEROSPACE SYSTEMS ANALYSIS (3).** Pr., AE 326. Coreq., AE 439. Modeling of system elements, analysis of systems undergoing various motions connected with flight, and introduction to optimal linear control systems.
439. **STATIC STABILITY AND CONTROL (4).** LEC. 3, LAB. 3. Pr., AE 304. Introduction to static stability and control of flight vehicles including laboratory techniques for determination of stability parameters.
447. **AEROSPACE DESIGN I (2).** LEC. 1, LAB. 3. Pr. EHA 304, senior standing in AE. An application of the design process with emphasis on the development of creative thinking and team efforts. An investigation of a current aerospace problem which results in the presentation of oral and written technical reports. A three-quarter sequence with AE 448 and 449.
448. **AEROSPACE DESIGN II (2).** LEC. 1, LAB. 3. Pr., AE 447. A continuation of AE 447.
449. **AEROSPACE DESIGN III (2).** LEC. 1, LAB. 3. Pr., AE 448. A continuation of AE 448.
479. **HONORS THESIS (1-6).** Pr., COI and department head approval. Individual student endeavor consisting of directed research and writing of honors thesis. (AE Honors Program students only. May be repeated once for a maximum of 6 total credit hours.)
491. **SPECIAL PROBLEMS. (1-5 CREDIT HOURS TO BE ARRANGED).** Pr., departmental approval. Not open to graduate students.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **ADVANCED THREE-DIMENSIONAL AERODYNAMICS (3-5 CREDIT HOURS TO BE ARRANGED).** Pr., AE 304 and COI. Advanced concepts in the application of aerodynamic principles to finite wings and bodies, thickness effects, interference effects and computer simulation.
508. **INTRODUCTION TO COMPUTATIONAL FLUID DYNAMICS (5).** Pr., AE 304. An introduction to the application of modern numerical and computational techniques to problems arising in fluid dynamics. Emphasis will be placed on solving both practical problems and understanding the basic physical phenomenon involved.
514. **EQUILIBRIUM GAS DYNAMICS (3).** Pr., COI. Basic concepts of the equilibrium kinetic theory and the equilibrium real gas properties. Aero-thermodynamic fundamentals of external flows for various atmospheric flight conditions in terms of flight speeds, altitudes and vehicle geometry.
516. **ROCKET PROPULSION I (3).** Pr., AE 415. Detailed analysis of the thermodynamics, gasdynamics, and design of liquid-propellant rockets.
517. **ROCKET PROPULSION II (3).** Pr., AE 415. Design and performance analysis of solid-propellant rocket motors with emphasis on internal ballistics.
520. **DYNAMIC SIMULATION (3).** Pr., AE 326. Computer techniques applied to the analysis of aerospace engineering problems using analog and hybrid computers and the digital problem-oriented language Advanced Continuous Simulation Language (ACSL).

521. **FLIGHT VEHICLE STRESS ANALYSIS (3).** Pr., AE 409. Stress analysis related to aircraft, missile, and space structures.
524. **NONEQUILIBRIUM GAS DYNAMICS (3).** Pr., COI. Nonequilibrium kinetic theory of real atmospheric gases. Applications of the thermal and chemical nonequilibrium conditions to the external flows for various flight conditions.
528. **SPACE PROPULSION SYSTEMS (5).** Pr., AE 415. Introduction to reaction engines for use in outer space vehicles. Power requirements for space missions, nuclear power systems, ion engines, magnetohydrodynamics and plasma accelerators, and photonic engines.
529. **AIRCRAFT VIBRATION AND FLUTTER (4).** Pr., AE 326, AE 409. Free, forced, and damped vibration of single and multiple degree-of-freedom systems; introduction to vibration of continuous systems; introduction to flutter theory; applications in aerospace.
533. **ASTRODYNAMICS II (3).** Pr., AE 432. Elements of general perturbation theory; n -body formulation and introduction to 3-body problem; introduction to powered flight analysis and space flight guidance.
535. **ELEMENTS OF V/STOL FLIGHT (3).** Pr., AE 303 or COI. The analysis of methods for generating high lift at low vehicle forward speeds.
536. **ROTARY WING AERODYNAMICS (3).** Pr., AE 303. Aerodynamics and flight characteristics of the rotary wing aircraft.
541. **DYNAMIC STABILITY AND CONTROL (3).** Pr., AE 439. Derivation of the kinematic and dynamic equations used to describe the motions of aircraft. Analysis of the stability of steady state flight conditions. Response of aircraft to actuation of controls.
542. **AUTOMATIC STABILITY AND CONTROL (3).** Pr., AE 541. Principles and techniques of automatic control of aircraft and missiles. Effects on design variables.
543. **FLIGHT SIMULATION (3).** Pr., AE 541 and COI. Time domain simulation to the nonlinear six-degree-of-freedom motion of aircraft. Models for aerodynamics, propulsion and control systems. Special computer techniques applied to the generation of various flight profiles.
545. **MISSILE AERODYNAMICS (3).** Pr., AE 304, AE 439. Aerodynamics of slender wing-body configurations for the low supersonic, moderate hypersonic and Newtonian continuum flow regimes. Linear and non-linear effects are considered as well as interference effects. Application to missile performance and stability for certain flight profiles.
580. **ENGINEERING LAW AND ETHICS (3).** Pr., senior standing. Addresses the role of law in the manufacture of a product, including legal issues of contracts, product liability, workers' safety and environmental control. Considers ethical issues which may confront designers and engineers.

GRADUATE

601. **ADVANCED SUPERSONIC AERODYNAMICS (5).** Pr., AE 400. A rigorous development of linearized and non-linear fluid flow theories and application. Lifting surfaces, lifting bodies, duct flow, boundary layer effects, shock and expansion waves, and method of characteristics are considered.
602. **ADVANCED ELEMENTS OF HIGH SPEED AERODYNAMICS (5).** Pr., AE 601 or equivalent. A continuation of AE 601 to include three-dimensional wing theory; slender body theory and similarity laws for subsonic, supersonic and hypersonic flow conditions.
603. **HIGH-SPEED VISCOUS AERODYNAMICS (5).** Pr., AE 602 or equivalent. A continuation of AE 602 to include effects of conductivity and viscosity on aerodynamic properties.
604. **ADVANCED LOW SPEED AERODYNAMICS (3-5).** Pr., AE 300, 303. Theoretical analysis of two dimensional airfoils. Joukowski transformations, Theodorsen's theory and other techniques for determining flow characteristics over any two-dimensional airfoil. Finite wing analysis; lift distribution on finite wings.
605. **AEROELASTICITY (3-5).** Pr., AE 529. May be taken more than one quarter, not to exceed 10 hours. General formulation of aeroelastic problems, divergence, flutter and loss of control, dynamic stress, panel flutter.
607. **NUMERICAL METHODS FOR VISCOUS FLOWS (5).** Pr., AE 508 or equivalent. The numerical methods employed in the investigation of complex fluid flows in which viscosity plays an important role. Solution of the laminar and turbulent boundary layer equations, turbulence modeling, solution of the parabolized Navier Stokes equations and the full Navier Stokes equations.
608. **AEROSPACE STRUCTURAL DYNAMICS (3-5).** Pr., AE 529. Advanced theory of matrix structural analysis with applications to dynamics of flight.
609. **ADVANCED AERO-STRUCTURES (3).** Pr., AE 529. Vibrations of solids and wave propagation, introduction to general methodology and thermodynamics of solids; derivation of large-deflection equations, principles of basic solids investigations, and application to aerospace structures.
610. **ADVANCED VIBRATIONS PHENOMENA (3-5).** Pr., AE 529. Aerospace applications of dynamic phenomena measurement including linear varying differential transformers, piezoelectric accelerometers, dynamic force gages, and strain gages. On line use of hybrid and digital computers for data analysis and combined experimental simulation involving both experiment and computer. Use of various types of shakers in dynamic tests.
611. **THRUST GENERATION (5).** Pr., AE 415. Aerothermodynamics of compressible flow, chemical propellant characteristics, heat transfer in fluid flow, nuclear propulsion.
612. **AEROTHERMOCHEMISTRY OF PROPULSION (3-5).** Pr., AE 611 or COI. Selected topics emphasizing interrelation between internal aerodynamics and combustion phenomena in air-breathing jet engines and rockets. Various techniques of establishing equilibrium composition and flame temperatures; comparison of frozen and equilibrium flow in nozzles; effects of condensed phases; supersonic combustion.
613. **ADVANCED AIR-BREATHING PROPULSION (3-5).** Pr., AE 611 or COI. Selected topics emphasizing interaction between external aerodynamics and performance of air-breathing jet engines, boundary layer effects in diffusers and compressors, and detailed analysis of various techniques of minimizing detrimental effects; compressor and turbine matching in turbojets, cascade aerodynamics, and variable area jet nozzles.

615. **HYPERSONIC FLOW THEORY (3-5).** Pr., AE 400. May be taken more than one quarter, not to exceed 15 hours. Hypersonic continuum theory, governing equations of motion for two and three dimensional flows, hypersonic small disturbance theory, viscous effects. Real gas effects in gas dynamics and rarefied gas flows, basic heat transfer concepts.
616. **REAL GAS DYNAMICS (3-5).** Pr., COI. May be taken more than one quarter, not to exceed 15 hours. A microscopic approach to gas dynamics based on quantum mechanical models and statistical techniques.
617. **MOLECULAR THEORY OF AERODYNAMICS (3-5).** Pr., COI. May be taken more than one quarter, not to exceed 15 hours. Free molecular, near-free-molecular, and transition flows of neutral gases are considered. Basic equations are developed and selected geometries are treated in detail.
624. **APPLIED NUMERICAL METHODS FOR AEROSPACE STRUCTURAL ANALYSIS I: STATIC STRUCTURES (5).** Pr., AE 409 or COI. Advanced techniques for the numerical solution of static elastic and plastic problems, including two-and-three-dimensional solutions. Analysis of problems with geometric and/or material non-linearities including isotropic and anisotropic material properties. Evaluation of the effects of stress concentrations, thermal and cyclic loading.
625. **APPLIED NUMERICAL METHODS FOR AEROSPACE STRUCTURAL ANALYSIS II: STRUCTURAL DYNAMICS (5).** Pr., AE 624 or COI. Advanced techniques for numerical solutions to problems in structural dynamics, including steady state and transient response of two-and-three dimensional structures. Evaluation of vibratory stresses with regard to high cycle fatigue. Particular emphasis will be placed on the dynamic analysis of plate and shell structures.
627. **INTRODUCTION TO LARGE SPACE STRUCTURES (LSS's) (3).** Pr., AE 434, 409, 529. Identification of the unique concepts, novel on-earth testing required, various schemes for damping, and the differences in analysis techniques related to LSS's. Concepts and analysis related to shape control, active and passive damping, structural dynamics/controls interaction. New scaling problems. Applications of BUNVIS.
630. **DYNAMICS OF FLIGHT (5).** Pr., AE 541 or COI. Derivation of equations of motion for variable-mass and flexible flight vehicles; small-disturbance theory and the linearized solutions of the general equations of unsteady motions, aerodynamic derivatives analysis, aerodynamic transfer functions, dynamic stability of uncontrolled longitudinal and lateral motions.
632. **FLIGHT DYNAMICS OF HYPERVELOCITY VEHICLES (3-5).** Pr., COI. May be taken more than one quarter, not to exceed 15 hours. Flight dynamics of steady and unsteady flight at hypersonic speeds, great-circle and minor-circle flight, re-entry, stability derivatives in hypersonic flow. Linearization of equations is investigated; static stability problems of hypervelocity vehicles are discussed.
633. **ESTIMATION THEORY AND FILTERING (3).** Pr., AE 533 or equivalent. Elements of orbit determination; least squares, norm, and minimum variance solutions; batch, sequential, and extended sequential processors; filter divergencies, state noise compensation algorithm; best linear unbiased estimates; observability concepts, error sources, and orbit accuracy.
634. **OPTIMAL ORBIT DETERMINATION (3).** Pr., AE 633 or equivalent. Estimation in the presence of unmodeled accelerations; nonlinear estimators; the multisatellite problem; orthogonal transformations, square root information filtering; ridge-type solutions for ill-conditions problems; consider-covariance analysis.
635. **OPTIMAL CONTROL OF AEROSPACE VEHICLES (5).** Pr., AE 434, 542, 635 or equivalent. Principles of optimization. Pontryagin's principle. Linear quadratic regulator. Observers, state estimation, LQG problem. Optimal output feedback. Synthesis of flight control systems.
636. **MULTIVARIABLE CONTROL THEORY IN AEROSPACE SYSTEMS (5).** Pr., AE 635, course in stochastic processes, or equivalent. Modeling in model reduction, model following control, Eigenstructure assignment. The problem of feedback for uncertain systems. Singular value decomposition. Characterization of uncertainties. Robust control. LQG/LTR design procedure.
638. **SPACECRAFT ATTITUDE DYNAMICS AND CONTROL (3).** Pr., AE 630 or equivalent. Introduction to spacecraft attitude dynamics and control; environmental forces and torques; dynamics of free rigid bodies; effects of energy dissipation on externally torque-free attitude motion; dual-spin attitude control using thrusters, magnetic torques and reaction wheels.
640. **ADVANCED ASTRODYNAMICS (3-5).** Pr., AE 533 or COI. May be taken more than one quarter, not to exceed 15 hours. Selected topics from indirect and direct methods of trajectory optimization, trajectory isolation techniques, special and general perturbation theories, oblate earth problem, three-body problem, spacecraft rotational motion, mission analysis methods, and new research developments.
642. **HELICOPTER DYNAMICS (3).** Pr., AE 536 or COI. Methods of analysis and design applicable to rotary wing aircraft; theoretical basis of analysis of helicopter dynamics, stability, and control.
690. **SEMINAR (CREDIT TO BE ARRANGED.)** May be taken more than one quarter. Weekly lectures on current developments in aerospace sciences by staff members, graduate students, visiting scientists and engineers.
691. **DIRECTED READING IN AEROSPACE ENGINEERING (1-5).** May be taken more than one quarter.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Aerospace Studies (AF)

- 101-102-103. **THE AIR FORCE TODAY (1-1-1). LEC. 1, LAB. 1.** The organization and mission of the United States Air Force through study of major commands. An introduction to strategic offensive and defensive forces, general purpose forces, aerospace support forces, and the total force concept.
- 201-202-203. **THE DEVELOPMENT OF AIR POWER (1-1-1). LEC. 1, LAB. 1.** Air power from balloons and dirigibles through the jet age; a historical review of air power employment in military and non-military operations in support of national objectives; and a look at the evaluation of air power concepts, doctrine, and technological change.

301-302-303. AIR FORCE MANAGEMENT AND LEADERSHIP (3-3-3). LEC. 3, LAB. 1. Practical applications of military briefings and writing; study of basic management functions, problem analysis, motivation, group dynamics, and leadership to provide fundamental skills for junior officers entering the active duty Air Force. The courses include seminars, guest lecturers, and experiential situations to develop officership. Open to qualified people only.

401-402-403. NATIONAL SECURITY FORCES IN CONTEMPORARY AMERICAN SOCIETY (3-3-3). LEC. 3, LAB. 1. Focuses on Armed Forces as an instrument of national power and an integral element of society; emphasizes civilian-military relations and how U.S. defense policy is developed and implemented. Prepares students for transition to initial active duty. Open to qualified people only.

Agricultural Economics and Rural Sociology (AEC) (RSY)

Professors Yeager, Head, Adrian, Clonts, Dunkelberger, Evans, Hardy,
Howze, Johnson, J.E. Martin, N.R. Martin, Molnar, and Taylor-Alfa Eminent Scholar
Associate Professors Baily, Burton, Crews, Fowler, Huddleston,
Jolly, Novak, Simpson, Stallings, and Young
Assistant Professors Duffey, Hatch, and Kinnucan
Instructor Smutko

Joint Appointee: Associate Professor Adams, Sociology
Extension Economists Hurst, Linton, Roberts, and Williams

AGRICULTURAL ECONOMICS (AEC)

- 101. INTRODUCTION TO AGRICULTURAL ECONOMICS (1). S-U GRADED.** Fields and scope of agricultural economics, growing importance, and significance of application of business principles to all phases of agriculture.
- 200. AGRICULTURAL ECONOMICS I (5).** All quarters. Economic principles with emphasis on farm-related production, marketing, prices, consumption, taxation, credit, finance, public policies and tenure. Treats utilization of land, labor, and capital. Credit not allowed in this course and EC 200.
- 202. AGRICULTURAL ECONOMICS II (5).** Pr., AEC 200 or equivalent. Continuation of economic principles with emphasis toward microeconomic concepts relating to farm firm. Credit not allowed in this course and EC 202.
- 210. MICROCOMPUTER APPLICATIONS IN AGRICULTURE (3). LEC. 2, LAB. 2.** Pr., 10 hrs MH. Introduction of microcomputer technology to increase understanding of use of computer decision aids in agricultural careers; hardware including microprocessor, display, keyboard, data storage and retrieval, printer and communication options; software including languages, electronic spreadsheet, word processing, data-based management, and programmed products; and interface with data source and processing systems.
- 301. AGRICULTURAL MARKETING (5).** Pr., AEC 200 or equivalent. Principles and problems in marketing farm products. Analysis of marketing functions, services, and costs; reducing costs and improving marketing efficiency. Marketing methods and distribution channels of major farm commodities. Market institutions and operation.
- 302. FARM RECORDS AND TAX MANAGEMENT (5).** Pr., AEC 200 or equivalent. Types and uses of farm records and accounts with emphasis on analyzing records to improve net farm income. Interpretation of income tax regulations and preparation of farm tax returns with emphasis on tax management.
- 303. AGRICULTURAL COOPERATIVES (3).** Pr., AEC 200. Principles and problems of organizing and operating farmers' cooperative buying and selling associations.
- 304. AGRICULTURAL FINANCE (5).** Pr., AEC 200. Economic problems and policies in financing agriculture.
- 305. FARM APPRAISAL (3).** Pr., AEC 200. Theory of land values; techniques on farm land and building appraisals for different purposes; relationships of land use, buildings, land titles, farm prices, taxes, and interest rates to land values; evaluation of appraisal methods and forms currently in use.
- 307. AGRICULTURAL LAW (5).** Legal environment of agriculture. Recognition of legal problems associated with property ownership, contracts, torts, financing, estate planning and environmental controls and restrictions.
- 399. AGRICULTURAL BUSINESS AND ECONOMICS INTERNSHIP (1-5). S-U ONLY. (MAY BE TAKEN FOR TOTAL OF 10 HRS.)** Pr., COI. To provide practical job experience under joint supervision of an employer and the department. Internships may be taken in a variety of agricultural business firms and agencies including finance, farm supply, production, marketing and sales, and government agencies. Training will prepare student for career employment.
- 490. SENIOR SEMINAR (1). LEC. 1.** Pr., senior standing. Pass-fail basis. Current developments in Agricultural Economics; the role of Agricultural Economics in the general economy.
- 499. DIRECTED STUDIES IN AGRICULTURAL ECONOMICS (1-5).** Pr., COI, junior standing. Individualized work and study in consultation with faculty member on subject of mutual concern. May include directed readings, research, analysis of an employment experience or a combination. Employment experience with a variety of agribusinesses and agencies may serve as the focus.

ADVANCED UNDERGRADUATE AND GRADUATE

- 501. FARM MANAGEMENT (5).** Pr., AEC 200 or equivalent. Principles of economics applied to agriculture, uses of farm records to improve management of the farm; developing enterprise budgets and use in preparing a profit-maximizing farm plan.
- 503. AGRICULTURAL PRICES (3).** Pr., AEC 200, MH 161, and MN 274, BST 215 or equivalent. Principles and factors in the pricing process with special reference to agricultural products and markets. Functions of prices and principles of supply and demand in price determination. Introduction to statistical estimation of price and demand relations.

505. **AGRICULTURAL POLICY (3).** Pr., AEC 200 or equivalent. Concepts, objectives and operation of public policies affecting agriculture. Development of agricultural policies in the United States.
509. **RESOURCE ECONOMICS (5).** Pr., AEC 202 or COI. Principal economic and institutional factors affecting man and his use of land. Supply, demand, and future requirements for land. Property rights, land use planning, zoning, taxation and other social controls affecting land utilization.
510. **AGRICULTURAL BUSINESS MANAGEMENT (5).** Pr., AEC 200 or equivalent. Principles and problems in acquiring, organizing and operating successful agricultural businesses, capital requirements, factors affecting location and growth, and measures of technical and economic efficiency in organization and operation; practices in buying, pricing, and merchandising, management problems and policies in financing, personnel, and public relations.
512. **ECONOMIC ASPECTS OF WATER RESOURCES MANAGEMENT (5).** Supply, demand, and use of water resources including economic, legal, and political dimensions. Economics of management of water resource use and conservation in terms of present and future supplies and needs. Both public and private water resources will be considered.
530. **WORLD AND U.S. AGRICULTURAL TRADE (5).** Pr., AEC 200 or equivalent. Theory and significance of international trade, world distribution of agricultural production and trade, important issues and policies, documentation, mechanics, and influence of exchange rates.
600. **ADVANCED AGRICULTURAL POLICY (5).** Pr., AEC 503 or 505. Farm problems and governmental actions taken to address these problems are discussed from historical, political, and analytical viewpoints. Current policy issues and proposals affecting the U.S. agricultural and food sector are reviewed. Concepts from welfare economics and other procedures are used to evaluate costs and benefits of existing and proposed governmental programs and actions affecting agriculture and consumers.
601. **ADVANCED FARM MANAGEMENT (5).** Advanced theory and application of farm management principles and economic concepts in agriculture. Organization, operation, and management of various types of farms. Optimum utilization of available resources on individual farms.
602. **ADVANCED AGRICULTURAL PRICES (5).** Pr., AEC 503 and EC 551 or equivalent. Theoretical analysis of forces determining prices and income in the agricultural sector. Short-run and long-run adjustments of product and factor markets. Research methods and empirical findings relative to prices, price trends, price cycles, and price structures.
603. **ADVANCED LAND ECONOMICS (5).** Man and his use of land as related to institutional factors. Economics of natural resource use, economic feasibility, benefit-cost analysis, economics of environmental control, and factors related to rural and urban land use.
604. **ADVANCED AGRICULTURAL FINANCE (3).** Pr., AEC 659, EC 603 or AEC 608, or COI. Basic theory and conceptual models including the capital asset pricing model and portfolio theory. Role of financial markets, financial intermediation and savings issues analyzed in a supply of funds context. Investment and valuation models will constitute the foundation of demand for funds analysis. Special issues including risk and finance in a developing country context.
605. **ADVANCED AGRICULTURAL MARKETING (5).** Theory of marketing with emphasis on its application to methods used and problems faced in marketing farm products. Objectives in agricultural marketing.
608. **ECONOMICS OF AGRICULTURAL PRODUCTION (5).** Pr., EC 551. Resource allocation and efficiency of production. Production and efficiency in the firm, between firms, and between agriculture and other industries. Influences on agricultural resource allocation and efficiency of risk and uncertainty.
610. **QUANTITATIVE RESEARCH TECHNIQUES IN AGRICULTURAL ECONOMICS (5).** Introduction to basic quantitative techniques with emphasis on linear programming and its extensions. Concepts of input-output analysis, Markov chain analysis, dynamic programming, inventory control, queuing processes, replacement and game theory are also introduced. General theoretical background and associated computational procedures are used for presentation of each technique.
611. **ECONOMIC DEVELOPMENT (5).** Conceptual and empirical analysis of economic development with emphasis on the lesser developed areas and countries. Analysis of financial and technical aid to other countries and case studies of development problems will be incorporated.
620. **ECONOMICS OF AQUACULTURE I (5).** Pr., AEC 200 or equivalent. Theory and application of economic principles of production, marketing, and consumption to aquaculture. Role of aquaculture in economic development with emphasis on international development.
621. **PROJECT PLANNING AND SECTOR ANALYSIS (5).** Pr., AEC 620 or COI. Application of economic principles for optimum resource allocation and welfare to the unique problems of planning the long range development of lesser developed countries. Orientation of course is toward international aid programs.
659. **INTRODUCTION TO ECONOMETRICS (3).** Pr., MH 161 or equivalent, MN 274 or equivalent, and AEC 200 or equivalent. Formulation of elementary economic models using economic theory and mathematics with certain basic assumptions or axioms. Mathematical tools used in economic analysis.
670. **RESEARCH METHODS IN AGRICULTURAL ECONOMICS (3).**
680. **SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS (CREDIT TO BE ARRANGED.)**
690. **SEMINAR (1-1-1), FALL, WINTER, SPRING.**
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
709. **ECONOMICS OF AGRICULTURAL PRODUCTION II (3).** Pr., AEC 608 and AEC 610 or COI. Firm level economics problems are extended with emphasis on alternate models of the firm and techniques of analysis. Aggregate modeling of agricultural industry and production sector responses. Advantages, limitations, and appropriate interaction of firm level and aggregate production problems are studied and evaluated.

716. **RESOURCE ECONOMICS, POLICIES AND PROGRAMS (5).** Impact of resource development on economic growth. Effect of taxation and tax policies. Interaction between technological change, resource use, and economic growth. Analysis of current policies and programs.
725. **ECONOMICS OF AQUACULTURE II (5).** Pr., AEC 620 or COI. Application of advanced economic theory and principles of production, marketing, and consumption to aquaculture. Analysis of comparative role and competitive position of aquaculture in economic development and resource allocation.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

RURAL SOCIOLOGY (RSY)

261. **INTRODUCTION TO RURAL SOCIOLOGY (5).** Basic sociological concepts and principles as applied to life in the rural community. Special attention given to the culture, social organization, and social problems of rural people in the United States, and in the South in particular. Credit not allowed in this course and SY 201.
362. **COMMUNITY ORGANIZATION (5).** General elective. Understanding the principles of community organization and effective citizenship. Survey of institutions, organizations, and agencies interacting to meet community needs.
370. **METHODS OF SOCIAL RESEARCH (5).** Pr., RSY 261 or SY 201. Principal methods of data collection and analysis in sociological research.
371. **APPLIED RESEARCH METHODS AND PROGRAM EVALUATION (3).** Basic social science research techniques used in needs assessment studies and program evaluations. Fundamentals of social surveys, field experiments, demographic analyses and applications, principles, and strategies of evaluation. Credit not allowed in this course and in RSY or SY 370.
498. **DIRECTED FIELD EXPERIENCE (5).** Structured involvement in an agency or organization serving rural counties and/or small communities under joint supervision of agency personnel and university faculty. Regular faculty-student conferences to discuss, evaluate, and interpret experience.
499. **DIRECTED STUDIES IN RURAL SOCIOLOGY (1-5).** Pr., COI, junior standing. Individualized work and study in consultation with faculty member on subject of mutual concern. May include directed readings, research, analysis of an employment experience or a combination. May be used to complement and expand on an employment experience.

ADVANCED UNDERGRADUATE AND GRADUATE

541. **EXTENSION PROGRAMS AND METHODS (5).** An indepth consideration of extension orientation in adult and continuing education in U.S. and developing nations. The Cooperative Extension Service is analyzed as an educational institution. Fundamental steps in program development and evaluation.
561. **RURAL SOCIOLOGY (5).** Pr., RSY 261 or SY 201. Theories and conceptual approaches to rurality. Rural-urban differences in demographic composition; occupational structure; attitudes and values of rural people; regional cultures; and the role of agriculture, mining, forestry, fishing, manufacturing, and service industries in rural life with attention to the nature of change.
562. **SOCIOLOGY OF COMMUNITY DEVELOPMENT (5).** Pr., RSY 261 or SY 201. Principles of applied social change at the community level in the U.S. Citizen participation in community affairs, impacts of economic changes on small communities; role of networks, neighborhoods, and local institutions in responding to community problems.
565. **SOCIOLOGY OF NATURAL RESOURCES AND THE ENVIRONMENT (5).** Overview of changing attitudes and institutional responses to the use and exploitation of natural resources. Conservation, preservation, and pollution control are treated as three primary sources of environmental concern. Global trends in population growth, energy availability, and environmental degradation are examined.

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662. **SOCIOLOGY OF COMMUNITY (3).** Overview of theories, conceptual approaches and methods for studying communities. Addresses institutional and organizational differences associated with community size, community power and decision making, and extra-local linkages to larger societal units.
663. **POLITICAL ECONOMY OF DEVELOPMENT (5).** Differing theoretical perspectives on societal development, with emphasis on the Third World. Emphasizes linkages between theory and development practice. Case studies of development in Latin America, Asia, and Africa will be examined.
670. **RESEARCH METHODS IN SOCIOLOGY (5).** Quantitative and qualitative procedures for obtaining social data using surveys, direct observation and secondary sources.
680. **SPECIAL PROBLEMS IN RURAL SOCIOLOGY (CREDIT TO BE ARRANGED.)**
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**

Agricultural Engineering (AN)

Professors Turnquist, Head, Curtis, Donald, Hill and Johnson
 Associate Professors Flood, Koon, Ogburn, Rochester, and Tyson
 Assistant Professors Kutz, Taylor, and Yoo
 Adjunct Professors Shafer and Taylor
 Adjunct Associate Professors Bailey, and Burt
 Extension Specialist Watson

COURSES FOR ENGINEERS

101. **INTRODUCTION TO AGRICULTURAL AND FOREST ENGINEERING (1).** LEC. 1, LAB. 2. S-U graded. Perspectives on the agricultural and forest engineering profession. Creative design and the engineer's approach to problem solving. Introduction to the technical specialties of engineering for agriculture and forestry and career opportunities (same as FYE 101).
130. **INTRODUCTION TO ENGINEERING DESIGN FOR BIOLOGICAL SYSTEMS. LAB. 3.** A supervised engineering design project to design components and/or systems to solve a real problem in an agricultural or forestry related industry. Open only to students classified as 01 or 02. (Same as FYE 130).
201. **ENGINEERING PRINCIPLES IN AGRICULTURE AND FORESTRY (5).** LEC. 4, LAB. 3. Pr., MH 161, coreq., FORTRAN Programming. Engineering concepts and principles applied to agricultural and forest problems. Creativity and design. Unit operations of agricultural and forest engineering (same as FYE 201).
311. **FUNDAMENTALS OF MOBILE EQUIPMENT DESIGN (5).** LEC. 4, LAB. 3. Pr., ME 301, 321, MH 265, and AN 201 or COI. Basic engineering analysis, synthesis, and design concepts applied to mobile field equipment and prime movers for agricultural, forestry, and industrial use. Includes mechanics of machines, traction mechanics, engine performance, safety and functional performance measurement (same as FYE 311).
313. **CONSERVATION AND WATER MANAGEMENT ENGINEERING (6).** LEC. 5, LAB. 3. Pr., AN 201, CE 310, FORTRAN Programming. Rainfall-runoff relationships. Soil erosion mechanics and control methods. Upstream flood control analysis and design. Soil-water-plant relationships. Theory and design of irrigation systems. Principles of agricultural drainage.
315. **AGRICULTURAL PROCESSING AND FOOD ENGINEERING (5).** LEC. 4, LAB. 3. Pr., AN 201, CE 310, ME 301. Design principles and equipment selection for crop, food and feed storage, preservation and manufacturing. Thermal processing, curing, drying, refrigeration, materials handling, pumps, fans and storage processes.
316. **ELECTRICAL SYSTEMS IN AGRICULTURE (5).** LEC. 4, LAB. 3. Pr., AN 201, EE 302, EE 303. Application of electrical power, equipment and control devices to agricultural systems. Special emphasis on safe and efficient power distribution, motor selection and performance, and theory and performance of sensing and control devices.
317. **ENVIRONMENT OF AGRICULTURAL STRUCTURES (3).** LEC. 2, LAB. 2. Pr., AN 201, 315, CH 104, 104L, BI 101. Functional requirements and design of animal shelters, greenhouses, and agricultural storage buildings. Emphasis on environmental control systems and energy management.
401. **DESIGNING AND SELECTING FOREST EQUIPMENT (3).** LEC. 3. Pr., AN 311, ME 316. Power requirements, design aspects, hydraulic systems, testing, rating and use of forest machinery. Vehicle-Terrain relationships. (Same as FYE 401.)
402. **FOREST ROADS DESIGN (3).** LEC. 2, LAB. 3. Pr., FY 304 Design, construction and maintenance of secondary and temporary road systems with an emphasis on preconstruction planning and design. Includes earth work calculations, drainage structures and erosion control. (Same as FYE 402.)
403. **APPLIED STRUCTURAL ANALYSIS AND DESIGN (3).** LEC. 2, LAB. 3. Pr., CE 207. Analysis and design of structural systems of agriculture and forestry. (Same as FYE 403.)
418. **WASTE MANAGEMENT AND UTILIZATION SYSTEMS (4).** LEC. 3, LAB. 3. Pr., AN 201, 313, 315, CH 104, 104L, BI 101. Theory and design of physical and biological treatment and processing systems for livestock waste management and utilization. The established technologies of lagoons and land application systems and the emerging technologies of energy production and refeeding are covered.
430. **ENGINEERING DESIGN FOR BIOLOGICAL SYSTEMS I (4).** LEC. 3, LAB. 3. Pr., AN 403, senior standing, COI. Design of equipment, structures, and systems for food, feed, fiber, forest products, and animal production and processing utilizing engineering principles. (same as FYE 430.)
479. **HONORS THESIS (1-6).** Pr., COI and department head's approval.
490. **SPECIAL TOPICS (2-5).** (CREDIT TO BE ARRANGED.) Pr., COI. May be taken more than one quarter for a maximum of 10 quarter hours. (Same as FYE 490.)

COURSES FOR NON-ENGINEERS

250. **WEATHER, CLIMATE AND AGRICULTURE (4).** LEC. 3, LAB. 3. An introduction to the elements of atmospheric science and how they combine to create variations in world climate. The relation of climate and climatic variation to agriculture with emphasis on the available sources of climatic information.
350. **SOIL AND WATER TECHNOLOGY (5).** LEC. 4, LAB. 3. Technical application of soil and water resources management. Irrigation system planning and equipment selection.
351. **AGRICULTURAL MACHINERY TECHNOLOGY (5).** LEC. 4, LAB. 2. Agricultural machinery: utilization, management, selection, and economic justification.
352. **TRACTOR AND ENGINE TECHNOLOGY (5).** LEC. 4, LAB. 2. Tractors and engines. Operation, fuels used, size selection, utilization, and economic justification.

353. **FARM BUILDINGS TECHNOLOGY (5). LEC 4, LAB. 3.** Selection of materials, methods of construction and functional needs of modern farm building.
354. **AGRICULTURAL PROCESSING TECHNOLOGY (5). LEC 4, LAB. 3.** Agricultural processing systems: includes storing, drying, pelleting, mixing and automatic materials handling systems.
355. **PRINCIPLES OF FOOD ENGINEERING TECHNOLOGY (5). LEC. 4, LAB. 3. Pr., MH 161, PS 205.** Engineering concepts and unit operations used in processing and handling of food products.
357. **ENVIRONMENTAL QUALITY AND AGRICULTURE (4). LEC., 3, LAB. 3. Pr., CH 104.** Basic introduction to pollution, measurement, nutrient cycles in nature, point and non-point source pollution, treatment and utilization of animal wastes and energy recovery from agricultural residues.

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501. **AGRICULTURAL POWER AND MACHINERY DESIGN (3). LEC. 2, LAB. 3. Pr., AN 311.** Design of equipment and systems to apply engineering principles to solutions of agricultural power and machinery problems. Functional requirements, safety, reliability, service conditions, power measurement, useful life, and creative design are combined to obtain designs for agricultural machine and power units.
503. **SOIL AND WATER ENGINEERING II (3). LEC. 2, LAB. 3. Pr., AN 313 or COI.** Theory and design considerations of selected topics in irrigation, erosion, non-point source pollution, drainage or upstream flood control.
505. **ELECTRICAL AND PROCESSING SYSTEMS DESIGN (3). LEC 3. Pr., AN 315, 316.** Design and layout of material handling systems, fundamental theory of particle movement, study of sensing and feed-back systems to include automatic controls and servo-mechanisms.
507. **AGRICULTURAL STRUCTURE DESIGN II (3). LEC. 3. Pr., AN 317, 403.** Functional requirements and design of animal shelters and agricultural storage buildings.
509. **HYDRAULIC CONTROL SYSTEMS (5). LEC. 4, LAB. 3. Pr., CE 310 or ME 340.** Design and analysis of hydraulic systems, with an introduction to control system theory and design. Construction and operation of hydraulic components, includes component disassembly and system design, modeling and testing. (Same as FVE 509.)
530. **ENGINEERING DESIGN FOR BIOLOGICAL SYSTEMS II (4). LEC. 2, LAB. 6. Pr., AN/FYE 430 and COI.** A supervised engineering design project to design components and/or systems to solve a real problem in an appropriate industry. Utilization of many engineering principles is required (same as FVE 530).
590. **SPECIAL TOPICS. (CREDIT TO BE ARRANGED.) (2-5). Pr., COI.** May be taken more than one quarter for a maximum of 10 quarter hours. (Same as FVE 590.)
593. **PRACTICUM (1-5). MAY NOT EXCEED 10 HOURS CREDIT. NOT OPEN TO MAJORS IN AGRICULTURAL ENGINEERING.** Provides students with experience in Agricultural Engineering Technology closely relating theory and practice, usually carried on simultaneously.
650. **WATER MANAGEMENT IN AQUACULTURE (4). LEC. 3, LAB. 3. Pr., FAA 626 or COI.** Analysis of water supply and delivery systems. Includes surface runoff, drainage, water measurement, hydraulic structures, ground water, pumps and pipe flow. Not for credit for engineering majors.

GRADUATE

601. **ADVANCED SMALL WATERSHED HYDROLOGY (4). Pr., AN 503, CE 512.** Hydrograph synthesis. Mathematical modeling of runoff and streamflow. Probability analysis of hydraulic events. Design of upstream systems for flood and erosion control and water supply.
602. **ADVANCED FARM POWER AND MACHINERY (5). Pr., AN 501 or COI.** Principles of operation and analysis of design of basic machine elements, hydraulic systems and functional requirements of farm power units, agricultural machinery and materials of construction.
604. **AGRICULTURAL ENGINEERING PROBLEMS (CREDIT TO BE ARRANGED NOT TO EXCEED A TOTAL OF 5 HOURS).** Special advanced engineering and design problems.
605. **SOIL DYNAMICS OF TILLAGE AND TRACTION (3). Pr., CE 430 or AY 555 or COI.** Analysis and measurements of soil reactions, as affected by the physical properties of the soil, when subjected to forces imposed by tillage implements and traction devices. Considered are shear, cohesion, adhesion, consolidation, plasticity and abrasion soil properties.
607. **ENGINEERING PRINCIPLES OF ANIMAL ENVIRONMENT (3). LEC. 3. Pr., AN 507 or COI.** Design and analysis of environmental equipment and systems for control or modification of animal production. Emphasis on evaluation of environmental factors which influence total environment.
608. **SEMINAR (CREDIT TO BE ARRANGED.)** Reviews and discussions of research techniques, current scientific literature and recent developments in agricultural engineering research.
610. **BIOLOGICAL AND PHYSICAL SYSTEM ANALYSIS I (3). Pr., MH 362.** Mathematical analysis and computer modeling of biological and physical systems including the formulation of differential equations with analytical and numerical solution techniques. Solutions by regression equations and by physical models. Decisions made under certainty, risk and uncertainty.
611. **SIMULATION METHODS IN ENGINEERING I (3). LEC. 2, LAB. 3. Pr., COI.** Principles of dimensional analysis and similitude and their application to physical model design and testing. Use of structural, fluid flow, thermal, and analog models as they pertain to biological and physical systems. Interdisciplinary applications.
612. **SIMULATION METHODS IN ENGINEERING II (3). LEC. 3. Pr., COI.** Mathematical model development and computer simulation of biological and physical processes and systems. Model elements include physical, biological and biochemical parameters. Interdisciplinary applications.
690. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.) (2-5). Pr., COI.** May be taken more than one quarter for a maximum of 10 quarter hours. (Same as FVE 690.)

699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

799. **DOCTORAL RESEARCH AND DISSERTATION. (CREDIT TO BE ARRANGED.)**

Agronomy and Soils (AY)

Professors Chapman, *Acting Head*, Ball, Burdett, Dane, Dickens, Evans, Hajek, Henderson, Hiltbold, Hood, Johnson, Touchton, and Walker

Associate Professors Bransby, Everest, Odom, Weaver, and Wehtje

Assistant Professors Adams, Mask, Miller, Mitchell, Mosjidis, Mullins,

Patterson, and Van Santen

Adjunct Professor Rogers

Adjunct Associate Professors Edwards and Elkins

Adjunct Assistant Professors Bostick and Reeves

200. **CROP PRODUCTION (5). LEC. 4, LAB. 2.** Winter, Spring. Production of crops used by man for food, feed and fiber including identification of crop plants, cultural practices, and processing.
301. **PRINCIPLES OF GRAIN PRODUCTION (5). LEC. 4, LAB. 2.** Winter, Spring. Fundamental factors involved in the economic production of corn, small grains, grain sorghum, peanuts and soybeans.
304. **GENERAL SOILS (5). LEC. 4, LAB. 2.** Pr., CH 105 and 105L or CH 207 or CH 203. Winter, Spring. The formation, classification, composition, properties, management, fertility, and conservation of soils in relation to the growth of plants.
305. **GENERAL SOILS (5). LEC. 4, LAB. 2.** Pr., CH 103-104. Winter. The formation, classification, composition and properties of soils and their influence on vegetative growth and development on forest lands. Open only to students in Forestry.
307. **GENERAL SOILS (5). LEC. 4, LAB. 2.** Pr., CH 103-104. Fall, Spring. The general field of soils including genesis, classifications and fertility.
310. **EARTH SCIENCE (5).** Materials of the earth; forces that shape and sculpture the earth's surface, including weathering, water, soil formation and erosion; soil geography; and historical geology. (Not open to students in College of Agriculture and Agricultural Education. Credit toward degree may not be earned in both this course and a General Soils course.)
312. **PRINCIPLES OF WEED SCIENCE (5). LEC. 4, LAB. 2.** Pr., BI 102 and CH 104. Fall. Basic weed identification and biology, methods of weed management, and classification of herbicides and how they are used in weed control.
315. **TURFGRASS MANAGEMENT (5). LEC. 4, LAB. 2.** Pr., BY 102. Fall. The management of recreational and home area turfgrass will be studied and will include the establishment and maintenance of turf and the effect of light, traffic, soil fertility, and water on its growth.
390. **AGRONOMY AND SOILS INTERNSHIP (5).** Pr., COI. S-U graded. To provide the student with practical experience under the supervision of an approved employer and the department. Internship may be in the areas of production, business, turf or science.
399. **PROBLEMS IN WEED SCIENCE (1). LEC. 1.** Pr., COI. Fall. Conferences, problems, and assigned reading in weed science.
401. **PRINCIPLES OF FORAGE PRODUCTION (5). LEC. 4, LAB. 2.** Pr., junior standing. Fall, Spring, Summer. Grass and legume forage crops. The crops are considered from the standpoint of (a) pasture crops, (b) hay and silage crops, (c) soil improving crops.
404. **FIBER AND OIL CROPS (5). LEC. 5.** Pr., junior standing. Winter. Most of the time will be devoted to cotton, soybeans and peanuts with a limited amount of time devoted to other fiber and oil crops.
420. **SOIL JUDGING (3). LEC. 1 LAB. 4.** Pr., AY 304, 305, or 307. Fall. Description, evaluation and interpretation of soil profile characteristics.
422. **FACTORS LIMITING CROP PRODUCTION (3). LEC. 3.** Winter. Factors influencing the production of crops including climate, water, soils. The role of plant and animal pests and the limitations created by the attitudes and mores of people.
490. **SENIOR SEMINAR (1). LEC. 1.** Pr., junior standing. Winter. S-U graded. Current developments and the role of crop and soil sciences.
499. **SPECIAL PROBLEMS (1-5) (CREDIT TO BE ARRANGED.)** Pr., departmental approval, junior standing. Not open to graduate students. Students will work under the direction of a staff member on special problems in crop, soil, or weed science.

ADVANCED UNDERGRADUATE AND GRADUATE

502. **SOIL FERTILITY (5). LEC. 5.** Pr., AY 304, 305 or 307. Winter. Lectures, demonstrations and problems illustrate principles of soil fertility as related to fertilizer practices and crop production. An advanced course, required of all students majoring in Agronomy and Soils. Either AY 502 or AY 507, but not both, may be used to satisfy the minimum requirement for the Master's degree.
506. **FERTILIZERS AND SOIL TESTING (5). LEC. 4, LAB. 2.** Pr., AY 304, 305 or 307. Spring. Manufacture and properties of fertilizer materials; properties and formulation of fertilizer mixtures; relative efficiency of various plant nutrient sources; principles and methods of soil testing and plant tissue testing.

- 507. SOIL MANAGEMENT (5). LEC. 5. Pr., AY 304, 305, or 307.** Summer. Physical, chemical and biological properties of soils and their management. An advanced course designed for students in Agricultural Education. Either AY 502 or AY 507, but not both, may be used to satisfy the minimum requirement for the Master's degree.
- 508. SOIL RESOURCES AND CONSERVATION (5). LEC. 4, LAB. 2. Pr., AY 304, 305 or 307.** Fall. Soils as a natural resource for land-use planning; their classification and management for crop production, recreation, and urban and industrial development.
- 509. SEED PRODUCTION (3). Pr., AY 201, or 401.** Spring, odd years. Methods and factors affecting production, storage, and processing seed.
- 510. METHODS OF PLANT BREEDING (5). LEC. 4, LAB. 2. Pr., ZY 300.** Spring. Genetic principles related to crop improvement including modes of reproduction, qualitative vs. quantitative traits, role of environment, and heritability. Study of breeding methods including pedigree selection, backcross, and recurrent selection.
- 515. SOIL MORPHOLOGY (5). LEC. 4, LAB. 2. Pr., AY 304, 305 or 307.** Spring. Physical, chemical and mineralogical properties of soils are studied in relation to their classification for engineering and agricultural uses.
- 516. ADVANCED TURFGRASS MANAGEMENT (5). Pr., AY 304, 315, BY 306.** Fall, odd years. Factors affecting the grass plant as a component of a dynamic turf community. Influence of soil chemical and physical conditions, management practices and climate will be discussed. Both theoretical and practical aspects of turf cultural practices will be discussed along with design and construction of athletic turf areas.
- 517. CROP QUALITY (5) LEC. 5. Pr., AY 201, or 401.** Spring. Quality of food, feed and fiber crops are regulated by genetic potentials, environment, management and utilization.
- 519. SOIL INTERPRETATIONS FOR PLANNING (5). Pr., COI.** Characteristics that significantly affect soil response under various uses. (Not open to students in College of Agriculture or Agricultural Education.)
- 593. PRACTICUM (1-5). (MAY BE REPEATED NOT TO EXCEED 10 HOURS CREDIT.)** Not open to majors in Agronomy and Soils. Provides students with experience in Agronomy and Soils closely relating theory and practice, usually carried on simultaneously.

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- 601. AGRONOMY PROBLEMS (1-5). (CREDIT TO BE ARRANGED.)** Conferences, problems, and assigned reading in soils and crops, including results of agronomic research from the substations and experiment fields.
- 606. SOIL MICROBIOLOGY (5). LEC. 3, LAB. 4. Pr., AY 502 and MB 300.** Spring, odd years. Soil microorganisms and their physiological processes related to soil development and plant nutrition. The role of microorganisms affecting the chemical and physical properties of soils will be studied, with emphasis on the cyclical transformations of nitrogen, phosphorous, carbon, and sulfur.
- 608. EXPERIMENTAL METHODS (5).** Fall, even years. Experimentation in the agricultural sciences including experimental techniques, interpretation of research data, use of library references and preparation of publications; and consists of problems, assigned readings, and lectures.
- 614. CHEMISTRY AND USE OF HERBICIDES IN CROP PRODUCTION (5). LEC. 4, LAB. 2. Pr., CH 104.** Fall. Principles and use of herbicides in agronomic crops. Acquaints the students with methods of application including equipment, time of application, methods of incorporation and formulation of herbicides. The fate of herbicides in soil and the ecological impact on succeeding plant species.
- 615. SEMINAR IN GENETICS (1). Pr., ZY 300.** Reports by students and staff members on current research and the literature in the field of genetics.
- 616. ADVANCED PLANT BREEDING (5). LEC 5. Pr., ZY 300, BST 501.** Winter, odd years. Estimation and interpretation of genetic variance components, heritability, selection response, yield stability indices, and their effect on choice of breeding methods. Other topics include recurrent selection theory and breeding for resistance to plant stresses.
- 617. THEORETICAL PLANT BREEDING (5). Pr., AY 510, AY 517, BST 601.** Winter, even years. Several aspects of genetical theory will be considered. Emphasis on the application of quantitative methods to experimental populations used to plan breeding programs.
- 618. CROP ECOLOGY (5). Pr., BY 306 or ADS 220.** Winter, even years. World population and food production problems. Origin, distribution and adaptation of crop plants as influenced by environment with emphasis on climatic and edaphic factors. Lectures and reading from current literature.
- 619. ADVANCED FORAGE CROPS MANAGEMENT (5). LEC. 3, LAB. 4. Pr., AY 401 and BY 306 or ADS 220.** Winter, odd years. Principles involved in successful establishment, maintenance, and management of crops used for grazing, hay and silage. Several field trips will be made to research stations and private farms to observe management practices.
- 625. CROP PHYSIOLOGY (5). LEC. 4, LAB. 2. Pr., BY 306, CH 208.** Winter, odd years. Principles of plant physiology as related to crop yield. Current crop physiological research discussed emphasizing methods of investigation and interpretation of results.
- 630. SOIL CHEMISTRY (5). LEC. 3, LAB. 4. Pr., AY 304, 305, or 307.** Winter. An introduction to the basic soil chemical properties of mineral composition, weathering, absorption, ion exchange, acidity, alkalinity, salinity, and soil reactions with fertilizers, pesticides, and heavy metals.
- 654. PRINCIPLES OF PLANT NUTRITION (5). Pr., AY 502.** Spring, even years. Processes of nutrient flux to plant roots growing in soil. Chemistry and properties of soils in relation to the nutrition and growth of plants.
- 655. SOIL AND PLANT ANALYSIS (5). LEC. 2, LAB. 6. Pr., CH 204 and AY 502.** Winter. Principles, methods, and techniques of quantitative chemical analysis of soils and plants applicable to soil science.

656. **SOIL CLAY MINERALOGY (5). LEC. 4, LAB. 2.** Fall, even years. Crystal structure and properties of the important clay size minerals of soils and clay deposits combined with identification techniques involving X-ray diffraction and spectroscopy, differential thermal analysis, electron microscopy, specific surface analysis, and infrared absorption.
659. **SOIL PHYSICS (5).** Pr., AY 304. Fall. Lectures and demonstrations to illustrate fundamental physical properties of soils. Introduction to flow and transport phenomena through soils.
690. **SEMINAR (1).** Fall and Winter. Required of all graduate students in Agronomy and Soils. May be repeated for credit.
699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)** Research and thesis on problems related to crop production, plant breeding, soil fertility, soil chemistry, and soil physics.
757. **SOIL PHYSICAL CHEMISTRY (5).** Pr., CH 507 and AY 630. Fall, odd years. Interpretation of soil properties and chemical reactions in terms of ion exchange, solubility diagrams, solution equilibria, electrochemistry, and electrokinetics of charged particles.
758. **ADVANCED SOIL PHYSICS (5).** Pr., MH 163, PS 205-206, and AY 659. Winter, odd years. Transport phenomena in soils. Physical principles and analysis of the storage and movement of water, solutes, heat, and gases in soils.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Animal and Dairy Sciences (ADS)

Professors Marpel, Head, Danion, Daron, Harris, Huffman, Jones,
Kuhlers, McCaskey, McGuire, Moss, Parks, Smith, and Strength
Associate Professors Cummins, Floyd, Gimenez, Ruffin, Schmidt, and Van Dyke
Assistant Professors Bartol, Blaylock, Burnell, Coleman, Hough, Mulvaney,
Rahe, and Trout

110. **ORIENTATION TO ANIMAL AND DAIRY SCIENCE (1). LEC. 1.** Fall. An introduction to the departmental programs and personnel. Job opportunities for the individual trained in Animal Science.
200. **INTRODUCTORY ANIMAL & DAIRY SCIENCES (5). LEC. 4, LAB. 2.** Fall, Winter, Spring. The importance of livestock to agriculture and to the nutrition of people. Livestock terminology, selection, reproduction, nutrition, management, marketing and species characteristics of beef cattle, swine, sheep and horses.
202. **PRACTICAL LIVESTOCK MANAGEMENT TECHNIQUES. (2) LAB. 4.** Pr., ADS 200. Fall, Winter, Spring. Animal behavior patterns and skills such as castration, vaccination, dehorning, and implanting will be practiced by each student. Simple management techniques such as animal restraint procedures, and making of a rope halter will be emphasized.
205. **LIVESTOCK PROMOTION AND MERCHANDISING (2). LAB. 6.** Pr., ADS 200. Fall. Showing, fitting, public display, sales management, and advertising as it relates to the promotion and merchandising of cattle, swine and horses.
220. **ANIMAL BIOCHEMISTRY AND NUTRITION (5). LEC. 5.** Pr., CH 104. Fall, Winter. Principles of animal nutrition and biochemistry and a study of nutrients and their utilization by animals.
260. **GROWTH AND BODY COMPOSITION (4). LEC. 2, LAB. 4.** Fall, Winter. Prenatal and postnatal growth of muscle, fat, and bone of meat animals; the evaluation of body composition, quality, and yield grading; the pricing of live animals and their carcasses.
315. **HERD HEALTH MANAGEMENT (5).** Pr., BY 300 and ZY 316 or equivalent. Spring. Prevention and control of the major diseases of farm animals and development of herd health programs.
320. **FEEDS AND FEEDING (4). LEC. 3, LAB. 2.** Pr., ADS 220. Fall, Winter, Spring. Characteristics of feedstuffs and general comments about their processing. Principles and practices of balancing and compounding of rations for beef and dairy cattle, horses, sheep, swine and pets.
330. **INTRODUCTORY LIVESTOCK EVALUATION AND MARKETING (3). LEC. 1, LAB. 4.** Pr., ADS 260. Winter. A comprehensive study of live animal and carcass evaluation techniques used in marketing and selecting beef cattle, swine and sheep.
331. **INTRODUCTORY MEAT SELECTION AND GRADING (3). LEC. 1, LAB. 4.** Pr., ADS 260. Winter. The development of grading standards and application of federal grades to lamb, pork and beef carcasses, comparative evaluation of carcasses and wholesale cuts. Some labs in nearby processing plants.
333. **DAIRY CATTLE JUDGING (3). LEC. 1, LAB. 4.** Pr., ADS 200. Spring. Theory and practice in the selection of dairy cattle.
350. **ANIMAL BREEDING (5). LEC. 4, LAB. 2.** Pr., ZY 300. Fall, Winter. Application of population genetics to the improvement of cattle, sheep and swine. Studies of different systems of selection and mating and their related efficiencies for livestock improvement.
351. **LIVESTOCK SELECTION (4). LEC. 2, LAB. 4.** Pr., ADS 350. Spring. Theory and practice in the use of applied genetics principles, performance records and visual appraisal in the selection and breeding of beef cattle, dairy cattle and swine.
361. **REPRODUCTIVE PHYSIOLOGY (5). LEC. 4, LAB. 2.** Pr., ZY 316. Fall, Winter. Comparative anatomy, physiology, and endocrinology of animal reproduction and lactation: techniques involved in the artificial insemination and pregnancy testing of farm animals. Applications of these principles to improving the efficiency of livestock.
362. **ARTIFICIAL INSEMINATION OF FARM ANIMALS (2).** Spring. Techniques involved in artificial insemination and pregnancy testing of farm animals. Application of these techniques to reproductive systems of livestock.
370. **MEAT SCIENCE (5). LEC. 4, LAB. 2.** Pr., ADS 260 or COI. Winter, Spring. Fundamentals of slaughter, processing, storage and merchandising of meat and meat products. Biochemical and physiological implications of nutrition, breeding and antemortem treatment on meat quality, curing and processing.

380. **UNDERGRADUATE SEMINAR (1).** Pr., junior standing. Spring. Lectures and discussions on job opportunities by staff and guests.
392. **PRACTICUM (3).** Fall, Winter, Spring, Summer.
401. **BEEF PRODUCTION (5).** LEC. 4, LAB. 2. The course will be taught assuming students know background information taught in ADS 260, 320, 350 and 361. Winter. To provide an overview of the beef cattle industry. To develop modern concepts, ideas and methodology associated with the application of technology to the solution of problems related to reproduction, breeding, nutrition, management and use of facilities in a modern beef cattle industry.
403. **DAIRY CATTLE PRODUCTION (5).** LEC. 4, LAB. 2. The course will be taught assuming students know background information taught in ADS 260, 320, 350 and 361. Winter. Practical application and integration of nutrition, breeding, reproduction, selection, herd health, economics, and management for efficient dairy production.
405. **HORSE PRODUCTION (5).** LEC. 4, LAB. 2. The course will be taught assuming students know background information taught in ADS 260, 320, 350 and 361. Spring. Practical application and integration of nutrition, breeding, reproduction, selection, herd health, economics and management for efficient horse production.
407. **SWINE PRODUCTION (5).** LEC. 4, LAB. 2. The course will be taught assuming students know background information taught in ADS 260, 320, 350 and 361. Fall. Practical application and integration of nutrition, breeding, reproduction, selection, herd health, economics, and management for efficient swine production.
410. **BEHAVIOR OF FARM ANIMALS (4).** LEC. 3, LAB. 2. Pr., ADS 361 or COI. Spring. Basic information on behavior, its purpose, and how it is measured will be followed by an examination of eating, locomotive, sexual, aggressive, territorial, maternal, and resting behaviors in pigs, sheep, cattle, and horses.
430. **ADVANCED LIVESTOCK JUDGING (2).** LEC. 1, LAB. 2. Pr., ADS 330, COI. Spring, Fall. May be repeated for a maximum of 4 hours credit. An advanced course in the principles and techniques of grading and selecting livestock based on visual evaluation.
431. **ADVANCED MEAT JUDGING (2).** LEC. 1, LAB. 4. Pr., ADS 331. Spring, Fall. May be repeated for a maximum of 4 hours credit. Practice in evaluation and grading of beef, pork and lamb carcasses and cuts. Development of communication skills for the meat industry and exposure to animal agriculture through training in local meat packing plants and intercollegiate competition.
432. **ADVANCED ANIMAL EVALUATION AND MARKETING (2).** LEC. 1, LAB. 4. Pr., ADS 430 or 431. Winter, Spring. May be repeated for a maximum of 4 hours credit. A comprehensive study of live slaughter animal and carcass evaluation techniques used in marketing cattle, sheep and swine.
433. **ADVANCED DAIRY CATTLE JUDGING (3).** LEC. 1, LAB. 4. Pr., ADS 333. Fall. Advanced course in the selection of dairy cattle.
470. **MEAT PROCESSING (5).** LEC. 3, LAB. 4. Pr., ADS 370. Spring. Principles of meat processing; portion control, restructured meat technology, curing reactions and sausage processing. Physical, sensory, and biochemical properties of processed meat.
477. **HONORS THESIS (3-6 Credits).** Repeatable once for a maximum of six hours credit.
490. **SPECIAL PROBLEMS (1-5).** (CREDIT TO BE ARRANGED.) Pr., departmental approval, senior standing. Fall, Winter, Spring, Summer. Not open to graduate students. Students will work under the direction of staff members on specific problems.
495. **INTERNSHIP IN ANIMAL AND DAIRY SCIENCES (5-15).** Pr., COI. S-U only. Fall, Winter, Spring, Summer.

ADVANCED UNDERGRADUATE AND GRADUATE

507. **ADVANCED SWINE MANAGEMENT (5).** Pr., ADS 407, junior standing, COI. Spring. Advanced course in the study of management techniques, facility design and operation of modern swine production systems.
508. **ADVANCED BEEF PRODUCTION (5).** LEC. 4, LAB. 2. Pr., ADS 260, 320, 401. Knowledge of ADS 520 and AEC 210 helpful. Spring, alternate years. Practical application and integration of nutrition, herd health, purchasing, marketing, economics and management of beef cattle in stocker and feedlot enterprises. Laboratories include animal handling feedlot management techniques and use of computers for decision-making and program analysis.
520. **ADVANCED ANIMAL NUTRITION (5).** LEC. 4, LAB. 2. Pr., ADS 320, CH 207. Fall. Nutrition of farm animals; the integration of animal physiology and nutrient metabolism with applied feeding practices used in animal production; discussion of recent nutritional developments.
565. **PHYSIOLOGY OF LACTATION (3).** LEC. 3. Pr., ADS 220 and ZY 316. Fall. The mammary gland, its structure and functions including uptake of precursors and the synthesis and secretion of milk.
593. **PRACTICUM (1-5).** (MAY BE REPEATED NOT TO EXCEED 10 HOURS CREDIT.) Not open to majors in Animal and Dairy Sciences. Provides students with experiences that closely relate theory and practice.

GRADUATE

(Graduate Standing Required)

618. **BIOCHEMISTRY (5).** LEC. 4, LAB. 3. Pr., CH 208. Fall. Classification, structure, and chemistry of the major chemical constituents of living matter.
619. **BIOCHEMISTRY (5).** LEC. 4, LAB. 3. Pr., ADS 618 or equivalent. Winter, Spring. Introduction to metabolism.
625. **ADVANCED MONOGASTRIC NUTRITION (3).** LEC. 3. Pr., ADS 619 and ZY 560 or COI. Spring (even years). Digestion and absorption, nutrient utilization, requirements, and interrelationships in swine and other monogastric animals.
627. **ADVANCED RUMINANT NUTRITION (5).** Pr., ZY 560 and ADS 619 or COI. Spring (odd years). Rumen fermentation and the biochemistry of ruminant metabolism.

644. **TOPICS IN BIOCHEMISTRY (2-6 HRS. CREDIT — TO BE ARRANGED.)** Pr., ADS 619 or equivalent and COI. Fall, Winter, Spring. (Same course as CH 644.)
645. **BIOCHEMICAL RESEARCH TECHNIQUES (5).** Pr., ADS 619 or equivalent. Summer. Modern biochemical laboratory techniques.
646. **MICROBIAL BIOCHEMISTRY (5).** Pr., CH 519 or equivalent, MB 300 or equivalent. Fall. The anatomy, growth and metabolism of the bacterial cell with emphasis on the biochemical makeup of the cell and the regulation of its activities.
650. **EXPERIMENTAL METHODS (5).** Pr., BY 601. Spring (odd years). Research methods used in the animal sciences for the analysis and interpretation of data. Included are experimental designs, experimental techniques and evaluation of research projects.
660. **PHYSIOLOGY OF GROWTH (3).** Pr., ADS 619 or COI. Fall. Molecular and cellular basis of tissue differentiation, growth and development with a primary emphasis on muscle, adipose and connective tissues. Major factors influencing gene expression during growth including genetic, endocrine, metabolic rate and growth regulators will be emphasized in discussions of current literature.
661. **ADVANCED REPRODUCTIVE PHYSIOLOGY (5).** Pr., ADS 361, ZY 524. Spring. Physiology and endocrinology of reproduction.
671. **ADVANCED MEAT SCIENCE (5). LEC. 5.** Pr., ADS 370, ADS 619 or CIO. Winter. Muscle microanatomy, biochemistry, chemistry of muscle proteins and lipids, lipid-protein interactions, microbiology, antemortem and postmortem factors affecting fresh and processed meat quality; discussion of current scientific literature.
680. **SEMINAR (1).** Pr., graduate standing. Fall, Winter, Spring. An intensive study of selected topics in some facet of animal sciences.
690. **SPECIAL PROBLEMS (1-5).** Fall, Winter, Spring, Summer. Conference problems, assigned reading, literature searches in one or more of the following major fields: (a) animal biochemistry and nutrition, (b) animal breeding and genetics, (c) dairy products, (d) meats, (e) microbiology and (f) physiology and physiology of reproduction.
699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)** Fall, Winter, Spring, Summer. Research and thesis may be on technical laboratory problems or on problems directly related to beef and dairy cattle, sheep, swine or laboratory animals.
720. **MINERAL METABOLISM (3). LEC. 3.** Pr., ADS 619, ZY 560 or COI. Spring (odd years). The function of minerals in animal metabolism including digestion, absorption, metabolic function, distribution, and excretion.
721. **ENERGY METABOLISM (3).** Pr., ADS 619, 520, ZY 560, or COI. Spring (even years). Energy utilization and heat production by animals as related to cellular biochemistry and physiology; factors affecting the digestion and metabolism of feed energy and its contribution to the total energy needs of animals. Interpretations of classical and current research.
722. **PROTEIN METABOLISM (3).** Pr., ADS 619, ZY 560 or COI. Fall (odd years). Nitrogen metabolism in ruminant and monogastric species. Amino acid utilization by the animal body.
723. **VITAMINS (3).** Pr., ADS 619, ZY 524 or ZY 560 or COI. Spring (even years). Chemistry, nutrition and function of the vitamins in metabolism.
741. **PROTEINS (5).** Pr., ADS 619 or equivalent. Spring. Chemical and physical properties of amino acids and proteins, protein structures, and the reaction of protein structure to function.
742. **LIPIDS (5).** Pr., ADS 619 or equivalent. Fall. Chemistry of the lipids and their biological significance.
743. **ENZYMES (5).** Pr., ADS 619 or equivalent. Winter. The principles of enzyme chemistry including the physical chemical and catalytic properties of enzymes; classification of enzymes; and enzyme formation.
751. **POPULATION GENETICS (5).** Pr., ZY 300 or equivalent, BY 601. Fall (odd years). Genetic composition, variation and factors that bring about change in populations.
752. **ADVANCED ANIMAL BREEDING (5).** Pr., ADS 751 and BY 601. Spring (even years). Statistical tools and methodology used in animal breeding theory and research. Criteria of selection, methods of selection, evaluation of breeds and application to the animal industry.
760. **MUSCLE PHYSIOLOGY AND BIOCHEMISTRY (3).** Pr., ADS 619, ZY 561 or COI. Winter. Heterogeneity and plasticity of muscle as a tissue, ontogeny, differentiation, growth and regulation of metabolic and molecular properties of muscle fibers by innervation, usage, hormones and artificial modulation. Evaluation of current literature.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Architecture (AR)

Professors Bennett, Head, Davis, Doerstling, Faust, Gwin, Lundell,
Magyar, McPheeters, Millman, and Parker
Associate Professors Cook, Orgen, and Zorr
Assistant Professors Braly, Briggs, Finn, and LaFon
Visiting Assistant Professors Burleson, Hubbs, and Nakhjavan
Visiting Instructors Fisher, Keown, McAlpine, Martin, and Peek

ARCHITECTURE PROGRAM (AR)

100. **INTRODUCTION TO CAREERS IN ENVIRONMENTAL DESIGN.** Issues involved in the environmental design professions and the nature of commitment to curricula in this field. Open to all students.

- 101-102-103. DESIGN FUNDAMENTALS (5-5-5) LEC. 2-2-2. STUDIO 8-8-8** Pr., acceptance into AR, ID or LA curriculum. Design concepts are explored through two and three dimensional projects with architectural ideas. Lectures given on historic and contemporary precedents parallel studio work. Taught during the normal calendar year as well as concurrently during the summer quarter.
- 121. COMPUTERS IN ARCHITECTURE (3).** Introductory survey of existing and emerging techniques of computer utilization in architectural design, production, and management.
- 201-202-203. ARCHITECTURAL DESIGN (5-5-5) LEC. 2-2-2, STUDIO. 10-10-10.** Pr., AR 103, EH 103. Man and his needs are examined as the primary influences on the making of interior and exterior space, architectural form, and physical function. Lectures emphasize architectural methodology, contextualism and structure parallel studio projects.
- 261-262-263. HISTORY AND THEORY OF ARCHITECTURE (3-3-3).** Pr., 2nd year standing. The development of architecture from ancient times through contemporary examples. The cultural and social milieu, as well as the technology of each period will be investigated to better understand the basic determinants of architectural form. Composition of architectural space, will be considered. Illustrated lectures, readings, drawings, and reports.
- 301-302-303. ARCHITECTURAL DESIGN (5-5-5). LEC. 2-2-2, STUDIO. 14-14-14.** Pr., AR 203, AR 263, MH 161, PS 207. Theoretical, cultural, and environmental issues are posed for consideration in the analysis of architectural design problems of moderate complexity. Lectures emphasize the relationship between conceptual aspects of architectural form and technical systems of building parallel studio projects. Enrollment is limited in third year sequence as stated in the Admissions section of the School of Architecture.
- 320. PHOTOGRAPHY I (3).** Pr., Open to AR, BSC, ID & LA only. COI. An exploration of the 35MM SLR camera in black and white photography for personal expression and as a tool for design.
- 321. PHOTOGRAPHY II (3).** Pr., AR 320, COI. Development of individual photographic skills and insights into understanding of surroundings.
- 350. 20TH CENTURY ARCHITECTURE (3).** Pr., AR 263. Philosophical and theoretical architectural concerns of the twentieth century. Classroom format, readings, lectures, discussions and written reports.
- 360. APPRECIATION OF ARCHITECTURE (3).** General elective. Pr., 2nd year standing. (Not open to AR, ID, and LA students.) Architectural development with particular attention to American and contemporary examples. Illustrated lectures, reading, essays.
- 370. SPACES FOR LIVING (3).** General elective. Pr., 3rd year standing. (Not open to AR, ID, and LA students.) Contemporary concepts of design, spatial organization, materials, furnishing, and gardens in relation to all major types of residential architecture. Illustrated lectures, readings, reports.
- 401. ARCHITECTURAL DESIGN (5). LEC. 2. STUDIO. 14.** Pr., AR 303. Architecture and the urban condition is the primary theme in the design of buildings and spaces. Lectures emphasize urban issues, research methods, analysis and programming parallel studio projects of increasing complexity.
- 402. ARCHITECTURAL DESIGN (5). LEC. 2. STUDIO. 14.** Pr., AR 401, BSC 315, 353. Primary emphasis is on architectural design at a community scale. Lectures are conceived to facilitate the application of principles, techniques, and research methods introduced in the prerequisite planning courses.
- 403. ARCHITECTURAL DESIGN (5). LEC. 2. STUDIO. 14.** Pr., AR 402. Consideration given to architectural problems of advanced complexity, having significant impact on the urban environment. Lectures focus on contextual analysis, zoning, codes, and programming.
- 435. PRESENTATION TECHNIQUES (3). LAB. 6.** Pr., 2nd year standing. Experience with graphic presentation of architectural subjects in various media with the objective of improving ability for more effective communication of design.
- 451. SEMINARS IN METHODS AND PROCESS (3).** Explorations of the tools and techniques available to the design professional. Complete descriptions of specific seminars available from the department.
- 452. SEMINARS IN CONTEMPORARY ISSUES (3).** Investigation of significant topics and issues that present opportunities and constraints to architectural thought and practice. Complete descriptions of specific seminars available from the department.
- 453. SEMINARS IN INTERDISCIPLINARY STUDIES (3).** Various disciplines that impinge upon the design of buildings, including natural and social sciences, technology, and humanistic studies. Complete descriptions of specific seminars available from the department.
- 456. SEMINARS IN HISTORICAL PERSPECTIVES (3).** Theories, schools, or periods with the intent of expanding awareness of critical attitudes toward both the potentials and limitations of architecture. Focus of individual seminars will range from ancient to post-modern architecture. Complete descriptions of specific seminars available from the department.
- 457. SEMINARS IN ASPECTS OF DESIGN (3).** Detailed aspects of architectural design, such as form, space, style, meaning, imagery, or cultural context, with the intent of developing theoretical and analytical habits of thought. Complete descriptions of specific seminars available from the department.
- 458. SEMINARS IN DISCIPLINES OF ENVIRONMENTAL DESIGN (3).** Related design fields to broaden appreciation of the range of concerns of the design professional. Complete descriptions of specific seminars available from the department.
- 465-466. ARCHITECTURAL DESIGN (8-8). LEC. 2. STUDIO. 14-14.** Pr., AR 403, EH 402. A synthesis of the previous design experiences is stressed through advanced theoretical and problem-solving processes. Lectures and discussions on architectural expression and professional concerns parallel studio projects emphasizing detailing as well as overall building design.

467. **ARCHITECTURAL THESIS (8). LEC. 2. STUDIO. 14.** Pr. AR 466, 499. Thorough development of an architectural position is explored through a design problem of the student's own choosing, under the direction of the Thesis Committee and adviser(s). Lectures and discussions are designed to parallel student's work in the preparation of architectural drawings, models, details, and a written text.
469. **LIGHTING (3). LEC. 1, LAB 2.** Pr., 3rd year standing. An introduction to lighting, principles and techniques as applied to design in architecture and interior design.
- 471-472. **PROFESSIONAL PRACTICE (3-3).** Pr., 5th year standing. Procedure in architectural practice; construction methods, estimation of quantities and costs. Office organization; legal requirements; professional organizations and relations; civic responsibility, professional ethics.
474. **URBAN PLANNING (3).** A survey of planning history and theory; an examination of the basic forces, influences and planning practices shaping growth, development and revitalization of cities. Credit not allowed for both CP 674 and AR 474.
475. **URBAN DESIGN (3).** Illustration of the building processes that shape cities and urban regions; the three dimensional form and character of cities and the role of the planner and environmental design professional within these processes. Credit not allowed for CP 675 and AR 475.
495. **SPECIAL PROBLEMS. (CREDIT TO BE ARRANGED UP TO 5 HRS.)** Pr., 3rd year standing. Development of an area of special interest through independent study. May be a group or team effort under direction of the faculty and with prior approval of the head of the Department. Evaluation of the work may be by faculty jury. May be taken more than one quarter. Maximum credit of 15 hours.
499. **DESIGN RESEARCH (2).** Pr., AR 465. The selection and comprehensive programming of a terminal problem in architecture to be executed in AR 467.

INTERIOR DESIGN (ID)

Professors Blackwell, Hing, *Chairman*
 Assistant Professor Schumacher
 Visiting Instructor Epperson

215. **ELEMENTS OF INTERIOR DESIGN (5). LEC. 2, LAB 3.** Pr., AR 103. The profession of interior design including basic theory of interior design principles, aesthetics, and design concepts. Lectures, reading and discussions.
216. **ELEMENTS OF INTERIOR DESIGN (5). LEC. 2, LAB. 3.** Graphic drawing of interior spaces and related architectural design solutions. Lab projects involve development of delineation skills and techniques in graphic presentations.
217. **ELEMENTS OF INTERIOR DESIGN (5). LEC. 2, LAB. 3.** Basic drafting techniques and skills in relation to development of architectural working drawings required in the construction of interior spaces and equipment.
- 305-306-307. **INTERIOR DESIGN (5-5-5). LEC. 2-2-2, STUDIO 12-12-12.** Pr., AR 203. Admission upon recommendation of the Committee on Design. Analysis and solution of interiors of moderate complexity, with emphasis on domestic and commercial problems. Research, discussion, drawings, models.
- 365-366. **PERIOD INTERIORS (3). LEC. 3.** Pr., AR 261, 262, and 263. The development of interior spaces, furniture, fabrics, and accessories from pre-Renaissance to 1900. Illustrated lectures, readings, reports, and field trips.
367. **CONTEMPORARY INTERIORS (3). LEC. 3.** Pr., ID 366. The fundamental aspects of interior design, spatial order and characteristics, furniture and fabric design, from 1900 to date. Illustrated lecture, readings, reports.
- 405-406. **INTERIOR DESIGN (5-5). LEC. 2-2, STUDIO. 9-9.** Pr., ID 307. Admission upon recommendation of the Committee on Design. Analysis and solution of interiors of advanced complexity, with emphasis on institutional and public problems. Research, discussions, drawings, models.
407. **INTERIOR DESIGN (7). LEC. 2, LAB. 15.** Pr., ID 406. The development of a major design problem under the direction of the Committee on Design. Drawings, models, details; oral presentation for jury consideration.
408. **INTERIOR DESIGN RESEARCH (2). LEC. 1, LAB 3.** Coreq., ID 406. Selection and comprehensive programming of a terminal interior design problem to be executed in ID 407.
- 441-442. **PROFESSIONAL PRACTICE (3-3). LEC. 1, LAB. 3.** Office procedure and methods for interior designers; the techniques and execution of working drawings for buildings, cabinetry and interior details; specification. Discussions, drawings, inspections, reports.
495. **SPECIAL PROBLEMS. (CREDIT TO BE ARRANGED TO 5 HRS.)** Pr., 3rd year standing. Development of an area of special interest through independent study. May be a group or team effort under direction of the faculty and with prior approval of the department head. Evaluation of the work will be by faculty jury. May be taken more than one quarter. Maximum credit; 15 hours.

LANDSCAPE ARCHITECTURE (LA)

Professor Lundell, *Acting Chairman*
 Assistant Professors Campbell, LaHaie
 Visiting Assistant Professor Weaver

101. **SURVEY OF LANDSCAPE ARCHITECTURE (1). LEC. 1.** A lecture course for informing students about the Landscape Architecture profession. For non-Landscape Architecture majors.
261. **INTRODUCTION TO LANDSCAPE ARCHITECTURE (3).** Pr., 2nd year standing. A survey of the art and practice of landscape architecture; its aims, scope and philosophy.

- 262. DEVELOPMENT OF LANDSCAPE ARCHITECTURE I (3).** Pr., 2nd year standing. An historical analysis of man's progress in designing land and outdoor space to meet varying needs in different times and places. Emphasis on religious, economic, cultural, social and political conditions, topography and climate as style determinants. Landscape design from ancient times to the first quarter of the nineteenth century. Lectures and collateral reading.
- 263. DEVELOPMENT OF LANDSCAPE ARCHITECTURE II (3).** Pr., 2nd year standing. An historical analysis in continuation of AR 262 but may be taken separately. The impact of technological advance on the design of outdoor space. The shift from private to public works and the development of landscape architecture as an instrument of service in the public welfare. Lectures and collateral reading.
- 301-302-303. BASIC LANDSCAPE ARCHITECTURAL DESIGN (5-5-5). LAB 15-15-15.** Pr., AR 203, BSC 324, HF 222, HF 223, HF 321. Introduction to the analysis and organization of the basic components of the landscape, including spatial elements of earth, plants and structure; design of simple outdoor spaces as they relate to the natural and cultural environment; introduction to principles of planting composition; coordination with courses in landscape construction.
- 341. LANDSCAPE CONSTRUCTION I (5). LAB 15.** Pr., HF 321. Introduction to landscape construction with emphasis on interpretation of topography, problems in the development of land forms, and construction materials; simple site engineering.
- 342. LANDSCAPE CONSTRUCTION II (5). LAB. 15.** Pr., LA 341. Advanced landscape construction and site engineering; preparation of working drawings, specifications and estimates. This course will run parallel to and may be combined with LA 302.
- 343. LANDSCAPE CONSTRUCTION III (5). LAB. 15.** Pr., LA 342. A continuation of Advanced Landscape Construction and site engineering topics.
- 401-402-403. INTERMEDIATE LANDSCAPE ARCHITECTURAL DESIGN (5-5-5). LAB 15-15-15.** Pr., LA 302, LA 343. A continuation of third year landscape architectural design concepts and principles with increasingly difficult problems involving the total range of the physical environment.
- 431. ADVANCED PLANT COMPOSITION (5). LAB 15.** Pr., LA 401. A continuation of planting design incorporated in landscape design courses; emphasis on specific problems in respect to knowledge of plant characteristics and requirements in natural and man-made environments; preparation of planting plans and specifications.
- 455. SEMINAR IN LANDSCAPE ARCHITECTURE (5).** Pr., 4th year standing. A special experimental seminar or independent study course intended to cover topics not treated by regular course offerings.
- 465-466. ADVANCED LANDSCAPE ARCHITECTURAL DESIGN (8-8). LAB. 16-16.** Pr., LA 403. Advanced problem solving processes and synthesis of previous design experiences with application to the environmental problems of today. Consideration of the total scope of professional concerns with emphasis on problems at a regional scale and the team approach to design with allied professionals.
- 467. ADVANCED LANDSCAPE ARCHITECTURAL DESIGN (8). LAB. 16.** Pr., LA 466, LA 499. The extensive development of a problem which, by its relative comprehensiveness, will serve as a final examination for the professional degree of Bachelor of Landscape Architecture.
- 471. PROFESSIONAL PRACTICE I (5). LEC. 2, LAB 9.** Pr., LA 403, Coreq. LA 465. Procedure in landscape architectural practice; preparation of working drawings, specifications, and estimates.
- 472. PROFESSIONAL PRACTICE II (5).** Pr., LA 471. Office organization, legal requirements, professional organizations and relations, civic responsibility, professional ethics.
- 495. SPECIAL PROBLEMS IN LANDSCAPE ARCHITECTURE (3).** Pr., 3rd year standing. Development on a tutorial basis of an area of special interest through independent study. This may be a group or team effort under the direction of the faculty and with prior approval of the Head of the Department. Evaluation of the work shall be by faculty jury. May be taken more than one quarter. Maximum credit of 15 hours.
- 499. DESIGN RESEARCH (2).** Pr., LA 403. Directed studies and research involving the selection and comprehensive programming of a terminal problem in landscape architecture to be undertaken in LA 467.

COMMUNITY PLANNING

Professor Meyer, *Chairman*

ADVANCED UNDERGRADUATE AND GRADUATE

- 522. PLANNING AND ENVIRONMENTAL PERCEPTION (3).** Pr., COI. Analysis of human perception of the cultural, social and natural environments; the impacts of landscape alteration and their mitigation.
- 524. REAL ESTATE DEVELOPMENT (5).** Pr., COI. Survey and analysis of the financial, legal, administrative, planning and design factors influencing the process of real estate development from the perspectives of developers, planners and consumers.
- 525. HISTORIC PRESERVATION PLANNING (5).** Pr., COI. Planning for the preservation, restoration, conservation and adaptive reuse of historic buildings and sites within the comprehensive planning process.
- 527. DOWNTOWN REVITALIZATION (5).** Pr., COI. Review and analysis of the goals, principles, strategies and programs for restoring and revitalizing the downtown areas with particular emphasis on physical building and reuse activities and their relationships to fiscal, administrative and private sector organization.
- 535. CURRENT PLANNING ISSUES (3).** Pr., COI. Seminar examining topical issues in the fields of urban and regional planning.
- 545. RURAL AND COMMUNITY PLANNING (3).** Pr., COI. The nature of rural areas and communities, the perspective, responsibility and performance of the planning professional and a critical appraisal of regional and community plans.

564. **SITE PLANNING (5).** Pr., COI. Introduction to the art of site planning, an exposition of its principles and application of its techniques with both large and small scale projects.

GRADUATE

601. **HISTORY AND THEORY OF PLANNING (5).** Historical development of cities and regions, with particular emphasis on the interaction of their dynamic and structural elements; impact of the planning process and planner on public policy and private decision-making; responsibility and professional planning practice.
- 602-603-604-605. **PLANNING STUDIO (5-5-5-5).** Pr., COI. Use of the comprehensive planning process in individual and team activities to assist a client community, agency, or organization in the solution of a community, county, or regional planning problem under faculty direction in cooperation with other professionals, public agencies, and jurisdictions.
635. **PLANNING RESEARCH AND METHODS (5).** Pr., COI. Introduction to methods useful in the comprehensive planning process, including population projections, migration, economic base, resource allocation, interrelationships between population and facilities/services needs, and the use of land.
640. **PLANNING LAW (5).** Pr., COI. The legal base for local government, planning for and guiding development and conservation of land and other resources, including police powers and eminent domain, zoning, subdivision regulations, permit systems and administrative review, health laws and housing and construction codes.
674. **URBAN PLANNING (3).** A survey of planning history and theory; an examination of the basic forces, influences and planning practices shaping growth, development and revitalization of cities. Credit not allowed for both CP 674 and AR 474.
675. **URBAN DESIGN (3).** Illustration of the building processes that shape cities and urban regions; the three-dimensional form and character of cities and the role of the planner and environmental design professional within these processes. Credit not allowed for both CP 675 and AR 475.
696. **SPECIAL PROBLEMS IN PLANNING (1-5).** Pr., CP 674 and COI. Directed study in an area of special interest. Topic and credit to be arranged with adviser and approved by the chairman. May be repeated for a maximum of up to 10 quarter hours credit.
698. **PLANNING SYNTHESIS (5).** Pr., COI following satisfactory completion of oral examination. Demonstration of planning competence by the production of an original work in planning to include integration of knowledge from previous courses and experience in a proposed solution to a complex planning problem or project. The emphasis will link the student's area of specialization and the comprehensive planning process.

Art (AT)

Professors Gluhman, Head, Dugas, Hartsfield, Hatfield, Olson, Ross, Taugner, and Williams

Associate Professors Furr, La Roux, Markle, Morgan, Munday, Price, and Wagoner

Assistant Professors Comstock, Flemming, Heck, Lewis, Oldham, and Simpson
Instructor Mitchell

All studio courses require 10 hrs. contact with instructor and 5 hrs. of independent work.

101. **DRAWING I (3).** STUDIO 9. Not open to VAT majors; credit cannot be applied toward B.F.A. degree. Basic principles of freehand drawing.
102. **STUDIO ART I (3).** STUDIO 9. Not open to VAT majors; credit cannot be applied toward B.F.A. degree. Introduction to and practice in the application of the plastic elements, color, form, line, texture, space, etc. Emphasis on two-dimensional organization.
103. **CERAMICS (3).** STUDIO 9. Not open to VAT majors; credit cannot be applied toward B.F.A. degree. Pr., AT 102. Introduction to principles of sculpture and three-dimensional design using clay as a medium. Exercises in construction, modeling, casting, and wheel throwing.
104. **BEGINNING PAINTING (3).** STUDIO 9. Not open to VAT majors; credit cannot be applied toward B.F.A. degree. Water-based painting media and picture structure; exercise in still-life and landscape painting.
105. **DRAWING II (3).** STUDIO 9. Not open to VAT majors; credit cannot be applied toward B.F.A. degree. Pr., AT 101. Directed exploration and investigation of the elements of drawing through exercise/assignments involving the figure, still-life, objects from nature, and interior and exterior environments.
111. **FUNDAMENTALS (5).** STUDIO 15. Mechanical linear perspective.
112. **FUNDAMENTALS (5).** STUDIO 15. Representational drawing. Linear construction, proportion, freehand perspective, chiaroscuro, surface treatments.
113. **FUNDAMENTALS (5).** STUDIO 15. Pr., AT 111, 112. Interpretive drawing. Emphasis on creativity, composition and pictorial organization.
121. **FUNDAMENTALS (5).** STUDIO 15. Plastic elements. Relationship of the arts. Problems in basic design.
122. **FUNDAMENTALS (5).** STUDIO 15. Basic three-dimensional organization. Clay and other media.
123. **FUNDAMENTALS (5).** STUDIO 15. Pr., AT 121, 122. Advanced application of principles encountered in AT 121 and AT 122.
171. **HISTORY OF ART I (3).** LEC. 3. A survey of painting, sculpture, and architecture from Paleolithic through early Medieval times.

172. **HISTORY OF ART II (3). LEC. 3.** A survey of painting, sculpture, and architecture from Romanesque through Baroque periods.
173. **HISTORY OF ART III (3). LEC. 3.** A survey of painting, sculpture, and architecture from the Rococo period to recent times.
211. **BASIC FIGURE DRAWING (5). STUDIO 15.** Pr., AT 113, 121, 122, 171, 172, 173. Open to VAT majors only. Drawing in various media emphasizing a subjective approach to the human figure as form and as a compositional element. Live nude models will be utilized on occasion.
212. **FIGURE CONSTRUCTION (5). STUDIO 15.** Pr., AT 113, 121, 122, 171, 172, 173. Open to VAT majors only. Lectures deal with form, function and operation of skeletal and muscular parts of the body. Drawing from casts, skeleton, and, occasionally, from the live nude model.
213. **FIGURE DRAWING (5). STUDIO 15.** Pr., AT 123, 211, 212. Open to VAT majors only. Drawing from the model in various media, with emphasis on construction, interpretation, and expression. Live nude models will be utilized on occasion.
221. **GRAPHIC PROCESSES (5). STUDIO 15.** Pr., AT 111, 112, 123, 171, 172, 173. Open to VAT majors only. Graphic reproduction processes, preparation of art copy for reproduction, copy fitting, paper, related subjects.
222. **DESIGN SYSTEMS (5). STUDIO 15.** Pr., AT 111, 112, 123, 171, 172, 173. Design procedures for creative problem solving in areas of visual organization; emphasis on presentation and visualization of concepts.
223. **GRAPHIC FORMATS (5). STUDIO 15.** Pr., AT 113, 221. Applied problems in editorial and advertising layout. Emphasis on relationship of format to media.
- 231-331. **OIL PAINTING (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 232-332. **TRANSPARENT WATER COLOR (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 233-333. **ACRYLIC PAINTING (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 241-341. **RELIEF PRINTMAKING (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 242-342. **INTAGLIO PRINTMAKING (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 243-343. **PLANOGRAPHIC PRINTMAKING (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 251-351. **CLAY SCULPTURE (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 252-352. **WOOD SCULPTURE (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
- 253-353. **STONE SCULPTURE (5-5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173.
301. **ELEMENTARY SCHOOL ART (5). LEC. 2, LAB. 8.** Pr., junior standing. Cannot be taken for credit by VAT majors. An introduction to design principles and elements. The theory of teaching art, methods and materials especially related to elementary school art.
321. **PHOTODESIGN (5). STUDIO 15.** Pr., AT 113, 123, 171, 172, 173. Open to VAT majors only. Technical aspects of equipment, materials and processing. Emphasis on aesthetic analysis. Historical development of photography as related to visual communications. Some special expense required.
322. **PHOTOCOMMUNICATION (5). STUDIO 15.** Pr., AT 221, 321. Photography as applied communication. Emphasis on advanced technical and studio techniques.
323. **TYPOGRAPHICS (5). STUDIO 15.** Pr., AT 221. Practical applications of typography in advertising, editorial, and other contemporary formats. Historical and anatomical development of type and letter forms.
370. **ART OF THE UNITED STATES (3). LEC. 3.** Pr. sophomore standing. Architecture, painting, and sculpture from colonial to recent times.
371. **ANCIENT ART (3). LEC. 3.** Pr., sophomore standing. The arts of Mesopotamia and Egypt, of Aegean cultures, and of Greece and Rome.
372. **MEDIEVAL ART (3). LEC. 3.** Pr., sophomore standing. Carolingian, Ottonian, Romanesque, and Gothic art and architecture.
373. **RENAISSANCE ART (3). LEC. 3.** Pr., sophomore standing. Fifteenth and Sixteenth century art and architecture with emphasis on Italy.
374. **BAROQUE AND ROCOCO ART (3). LEC. 3.** Pr., sophomore standing. Seventeenth and eighteenth century European painting, sculpture, and architecture.
375. **NINETEENTH CENTURY ART (3). LEC. 3.** Pr., sophomore standing. Major art movements from Neo-Classicism to Post-Impressionism and Art Nouveau.
376. **TWENTIETH CENTURY ART (3). LEC. 3.** Pr., sophomore standing. Major art movements from 1900 to more recent times.
377. **PRE-COLUMBIAN ART (3). LEC. 3.** Pr., sophomore standing. The arts of Mexican, Yucatan, and Andean cultures before 1519.
378. **EARLY NETHERLANDISH PAINTING (3). LEC. 3.** Pr., sophomore standing. Covers the fourteenth to sixteenth centuries, from the Van Eycks and Van der Weyden to Van Leyden.
379. **THE ARTS OF JAPAN (3). LEC. 3.** Pr., sophomore standing. Key monuments, influences, and personalities from Jomon through Edo periods.

399. **VISUAL ARTS INTERNSHIP (5).** Pr., successful completion of all 200-level course requirements in student's major area. A period of seven weeks working full-time as a regular staff member with an approved internship sponsor under the direction of a supervising art director. Credit given as an art elective. Cannot be repeated for credit.
- 424-425-426. **VISUAL DESIGN I-II-III (5-5-5). STUDIO 15.** Pr., AT 213, 222, 223, completion of 18 hours of art history, and junior standing. Open to VAT majors only. The application of communicative procedures and skills necessary to convey messages by means of graphic presentation: an in-depth study of problem solving. Development of student's individual style and main potential.
427. **ELECTRONIC GRAPHIC DESIGN (5). STUDIO III.** Pr., AT 213, 222, 223, 424, or 464, junior standing or special permission. No substitution for Studio A or B requirements. Fundamentals of Electronic Graphic Design. Basic techniques of Apple Macintosh Plus and Thunderscan Digitizer. Emphasis on layout, graphic design and illustration projects utilizing computer techniques and equipment.
- 434-435-436. **ADVANCED PAINTING/DRAWING I-II-III (5-5-5) STUDIO 15.** Pr., AT 213, 231, 232, 233, completion of 18 hours of art history and junior standing. Open to VAT majors only. Advanced painting with medium and subject idea determined by instructor in consultation with the student. Emphases in these courses are the strengthening of the student's aesthetic awareness and technical skills as a maturing painter.
- 444-445-446. **ADVANCED PRINTMAKING I-II-III (5-5-5). STUDIO 15.** Pr., AT 213, 241, 242, 243, completion of 18 hours of art history and junior standing. Open to VAT majors only. Advanced printmaking with medium and subject idea determined by instructor in consultation with the student. Emphases in these courses are the strengthening of the student's aesthetic awareness and technical skills as a maturing printmaker.
- 454-455-456. **ADVANCED SCULPTURE I-II-III (5-5-5). STUDIO 15.** Pr., AT 213, 251, 252, 253, completion of 18 hours of art history and junior standing. Open to VAT majors only. Advanced sculpture with medium and subject idea determined by instructor in consultation with the student. Emphases in these courses are the strengthening of the student's aesthetic awareness and technical skills as a maturing sculptor.
- 464-465-466. **ILLUSTRATION I-II-III (5-5-5). STUDIO 15.** Pr., AT 213, 223, completion of 18 hours of art history and junior standing. Open to VAT majors only. Application of illustrative concepts, media and techniques to various graphic formats. Development of personal skills and an individual style.
484. **ADVANCED PHOTOGRAPHY (5). STUDIO 15.** Pr., 3.0 minimum average in AT 321 and COI. Open to students who have shown ability, initiative, and industry on individual projects. Independent study.
499. **SENIOR PROJECT (5).** Pr., completion of Group B Studio in area of concentration and must be taken during the student's final quarter. A directed terminal studio project with student's choice of subject and medium. The project will be exhibited and a committee will award a letter grade. Professional quality color slides of the project work must be presented to the Art Department before the student is cleared for graduation.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **ART IN EDUCATION (5). LEC. 2, LAB. 8.** Pr., senior standing. Cannot be taken for credit by VAT majors. Lectures, reading and research concerning principles and objectives of pertinent phases of Art for the purpose of understanding their significance in teaching at all levels. Emphasis is placed upon creativity rather than technical skill in laboratory experimentation.
520. **INDEPENDENT STUDY IN ADVANCED DESIGN (5).** Pr., 3.0 minimum average in AT 424, 425 and 426, senior standing. Open to students who have shown ability, initiative, and industry on individual projects.
530. **INDEPENDENT STUDY IN ADVANCED PAINTING (5).** Pr., 3.0 minimum average in AT 434, 435 and 436, senior standing. Open to students who have shown ability, initiative, and industry on individual projects.
540. **INDEPENDENT STUDY IN ADVANCED PRINTMAKING (5).** Pr., 3.0 minimum average in AT 444, 445 and 446, senior standing. Open to students who have shown ability, initiative, and industry on individual projects.
550. **INDEPENDENT STUDY IN ADVANCED SCULPTURE (5).** Pr., 3.0 minimum average in AT 454, 455 and 456, senior standing. Open to students who have shown ability, initiative, and industry on individual projects.
560. **INDEPENDENT STUDY IN ADVANCED ILLUSTRATION (5).** Pr., 3.0 minimum average in AT 464, 465, and 466, senior standing. Open to students who have shown ability, initiative, and industry on individual projects.
570. **INDEPENDENT STUDY IN ART HISTORY (3-3)+.** Pr., 18 hours of art history, senior standing. Open to students who have shown ability, initiative, and industry on individual projects. Research, drawings and reports on historical topics under supervision.

GRADUATE

- 621-622-623-624-625-626-627. **GRADUATE DESIGN AND ILLUSTRATION (5-5-5-5-5-5-5).** STUDIO 15-15-15-15-15-15. Open to MFA candidates only. Graduate level work in major areas of the broad based field of applied visual arts. Members of these courses must have a good general background in the subjects and some experience in practice. Course work will include philosophical concepts, experimental studies and applied techniques. Some liaison with industry is involved.
- 631-632-633-634-635-636-637. **GRADUATE PAINTING/DRAWING (5-5-5-5-5-5-5).** STUDIO 15-15-15-15-15-15. Open to MFA candidates only. Graduate level painting and/or drawing with student's choice of media and subject ideas. Students are expected to develop a mature personal style of work that exploits their full potential.
- 641-642-643-644-645-646-647. **GRADUATE PRINTMAKING (5-5-5-5-5-5-5).** STUDIO 15-15-15-15-15-15. Open to MFA candidates only. Graduate level printmaking with student's choice of media and subject ideas. Students are expected to develop a mature personal style of work that exploits their full potential.
- 651-652-653-654-655-656-657. **GRADUATE SCULPTURE (5-5-5-5-5-5-5).** STUDIO 15-15-15-15-15-15. Open to MFA candidates only. Graduate level sculpture with student's choice of media and subject ideas. Students are expected to develop a mature personal style of work that exploits their full potential.

- 671-672-673. GRADUATE ART HISTORY RESEARCH (5-5-5).** Research on approved topics in art history with personal interpretations of the various movements. Consultations and written reports.
- 697. CRITICAL ESSAY (5).** Pr., completion of all studio and art history requirements. The student is expected to give an indepth critical evaluation of his own works as they relate to theories developed in his research of art history. Conferences with study committee and a formal, written report are required.
- 698. TERMINAL STUDIO PROJECT (5).** Pr., completion of all studio and art history requirements. A major art problem consisting of a sustained single project or a logical sequence of shorter projects. The candidate will be required to conceive and execute a work or works exhibiting pronounced creative ability and technical proficiency. An exhibition of the completed project is required.
- †(3-3) May be repeated for maximum of 6 hours.

Aviation Management (AM)

Professors Williams, Head
 Program Coordinator Cash
 Associate Professor Kiteley
 Assistant Professors Edwards, Fenner, and Johnson
 Professional Flight Coordinator Cash
 Visiting Assistant Professor Popwell
 Visiting Instructor Hall

General Curriculum, GC, students (those with undeclared majors) may enroll only with departmental consent. Students that are not AM majors need departmental approval to take AM 400-level courses.

- 101. INTRODUCTION TO AVIATION (3).** Orientation into aviation management career opportunities and a history of significant events and accomplishments in man's attempt to move through air and space.
- 200. AEROSPACE PROBLEMS ANALYSIS (5).** Pr., MH 161. Application of basic mathematical and physical concepts to problems in the aerospace industry.
- 201. ELEMENTARY AERONAUTICS (5).** LEC. 5. Pr., AM 200. Basic flight physiology, subsonic and supersonic aerodynamics, aircraft propulsion and structures, and aircraft maintenance management.
- 207. BASIC PROGRAMMING AND APPLICATIONS TO AVIATION MANAGEMENT (3).** LEC. 3. Pr., AM 200. Introduction to the use of the computer as a problem solving tool. Program structure and development, decision making, documentation.
- 214. FLIGHT ORIENTATION (1).** LAB. 3. Basic flight experience course for non-pilots to familiarize aviation majors, engineers, teachers and other students desiring a limited exposure to flight. Course includes ground discussion, and aircraft flight time. Special Fee.
- 215-216. PRINCIPLES OF PRIVATE FLIGHT I, II (3-3).** General introduction and preparation for the FAA private pilot written examination. Topics: theory of flight, aircraft and engine performance, regulations, meteorology, navigation, airspace utilization, and aviation physiology.
- 217-218. PRIVATE PILOT FLIGHT TRAINING I-II (1-1).** LAB. 3-3 for 217. Pr., AM 215. For 218 Pr., AM 216 and 217, or COI. Dual and solo flight instruction and discussion to prepare for FAA Private Pilot Certificate. Special Fee.
- 220. STATISTICS (5).** LEC. 5. Pr., AM 200, 207. Introduction to the principles of statistical analysis and application.
- 304. ELEMENTARY METEOROLOGY (5).** LEC. 5. Pr., sophomore standing. Basic principles, causes, effects, and phenomena of weather with fundamental techniques of forecasting. Not open to Aviation Management students.
- 305. AVIATION METEOROLOGY (5).** LEC. 5. Pr., PS 206. Basic meteorology as it applies to the operation of aircraft with emphasis on observation of weather elements and the interpretation of flight planning weather information.
- 306. WEATHER OBSERVATION. (2).** Pr., AM 304 or AM 305. Techniques of weather observations and reporting of basic weather information for aviation. Provides assistance for qualification as a supplementary aviation weather station observer.
- 309. RECIPROCATING ENGINES AND PROPULSION PRINCIPLES (3).** Pr., PS 206, CH 103 and AE 203. Introduction to basic laws of operation and types of power plants. Detailed coverage of reciprocating engines including principles of operation, major components and testing performance.
- 310. JET PROPULSION (3).** Pr., AM 207, 309 and AE 203. Introduction to the basic laws of thermodynamics and physics as applied to jet propulsion. The major subsections are analyzed for their contribution to overall engine performance. Basic testing, performance and maintenance operations are presented.
- 312. PRINCIPLES OF AIR NAVIGATION (3).** Pr., AM 201. Practical air navigation and basic principles of aircraft guidance and control.
- 313. AEROSPACE VEHICLE SYSTEMS (5).** Pr., PS 206. Design, use, and function of typical hydraulic, pneumatic and electrical systems used on aircraft.
- 314. AEROSPACE MANAGEMENT AND OPERATIONAL PROBLEMS (5).** Pr., AE 203 or AM 207. Introduction to the use of operations research techniques. Included is the role of math modeling procedures, manual and computer generated solutions, applied to the decision making process.
- 320. ECONOMIC ANALYSIS IN THE AVIATION INDUSTRY (5).** LEC. 5. Pr., EC 200, AM 200, 207. Development of principles required in economic analysis.

322. **COMMERCIAL FLIGHT TRAINING I (1). LAB. 3.** Pr., Private Pilot Cert. and COI. Continuation of flight training toward a Commercial Pilot Certificate with emphasis on the development of precision and accuracy in all intermediate and advanced flight maneuvers. Special fee.
323. **AIRCRAFT OPERATION AND PERFORMANCE (4). LEC. 4.** Pr., Private Pilot Certificate or COI. Principles of aircraft performance and operations, aircraft systems, equipment, aviation weather theory and services, Federal Aviation regulations and preparation for FAA commercial written examination.
324. **COMMERCIAL FLIGHT TRAINING II (1). LAB. 3.** Pr., AM 322, Coreq., AM 323 and COI. Continuation of flight training toward Commercial Pilot Certificate. Emphasis on cross-country, night and instrument flying. Special fee.
325. **PRINCIPLES OF INSTRUMENT FLIGHT (5). LEC. 5.** Pr., AM 323 or COI. Instruments, FAA regulations, air traffic control procedures, radio navigation, and aircraft operation and performances as applied to instrument flying. Preparation for the FAA Instrument Pilot written examination.
326. **COMMERCIAL FLIGHT TRAINING III (1). LAB. 3.** Pr., AM 324, Coreq., 325 and COI. Continuation of flight training for the Commercial Pilot Certificate with training in transition to complex aircraft. A continuation of instrument and night instruction and a review of all maneuvers for the commercial flight test. Special fee.
327. **COMMERCIAL FLIGHT TRAINING IV (1). LAB. 3.** Pr., AM 326, Coreq., 325 and COI. Completion of FAA requirements for an unrestricted Commercial Pilot Certificate. Special fee.
337. **AIR TRANSPORTATION (5).** Pr., junior standing. Significance of air transportation and the development of the present system. Economic and social costs of the air transportation system.
401. **AERONAUTICAL SEMINAR (1). LAB. 2.** Pr., senior standing. Special problems and current status of the aerospace industry.
402. **LAND USE CONTROL (2).** Pr., AM 409. The methods of control of the use of private property with particular emphasis on property near airports.
403. **GENERAL AVIATION MANAGEMENT (3).** Pr., MN 310, junior standing. An overview of general aviation and its impact and interaction with the total aviation industry including a study of the various users, the suppliers and service organizations, the aircraft and facilities and regulatory framework.
404. **GENERAL AVIATION OPERATIONS (3). LEC. 2, LAB. 3.** Pr., AM 403. Current principles and practices in commercial and business/corporate flight operations including organizations, sources of revenue, functions, operation and typical problems.
405. **AVIATION SAFETY (3). LEC.** Pr., AM 201 or COI. Current problems and issues of aviation safety including aircraft accidents, their cause, effect, and the development of safety programs and procedures.
408. **AIR TRANSPORT PLANNING (3).** Pr., AM 409. Management decision making involved in selection of equipment, routes, and the establishment of rates by certificated and non-certificated air carriers.
409. **AEROSPACE LAW AND INSURANCE (3).** Pr., MT 241. The legal structure of aviation including federal, local, and state statutes, contracts, insurance and liability, regulatory statutes, and case law.
413. **AIRPORT MANAGEMENT (3).** Pr., MN 310, junior standing. Current practices in management of a civil public airport, including organization, functions, operations, sources of revenue, funding, maintenance and administration.
414. **AIRPORT PLANNING (3).** Pr., AM 413, principles and procedures pertaining to planning airport facilities required to meet the immediate and future air transportation of a community or region.
417. **AIRLINE OPERATIONS (5).** Pr., AM 337, senior standing. Airline operations, organization, and managerial practices, and the functions and planning process of various organizational components.
418. **INTERNATIONAL AIRLINES OPERATIONS (3).** Pr., AM 409, junior standing. International foreign air carriers, influences of ICAO and IATA, national ownership, determinants of power, operational and management practices, routes and fares.
419. **AIR TRAFFIC CONTROL (5). LEC. 5.** Basic air traffic control procedures, facilities, centers, and operations.
420. **AIR CARGO OPERATIONS (3).** Pr., junior standing. Domestic and international air cargo operations with emphasis on cargo economics, equipment, domestic and international regulatory activities, agents, operational techniques, systems, and problems.
421. **COMMUTER AIRLINE OPERATIONS AND MANAGEMENT (3).** Pr., AM 409, coreq., AM 417 or COI. Management practices and operational characteristics of the commuter airline and its place in the air transportation system.
427. **MULTI-ENGINE TRAINING I (2). LEC. 1, LAB. 3.** Pr., AM 327 or Commercial Pilot Certificate and COI. Instruction in the methods and techniques of multi-engine aircraft pilotage. Sufficient ground and flight instruction is given to qualify for the FAA pilot rating of Multi-Engine-Land. Special fee.
428. **PRINCIPLES OF FLIGHT INSTRUCTION (3).** Pr., AM 327. The principles of teaching as applied to instructing, analyzing, and evaluating flight students with emphasis on preparation for the FAA Flight Instructors Written Examination.
429. **FLIGHT INSTRUCTOR TRAINING (1). LAB. 3.** Pr., 327 Commercial Pilot Certificate, Coreq., AM 428 and COI. Discussion, instruction, and arranged practice in flight instruction in preparation for the FAA Flight Instructor Certificate. Special fee.
431. **MULTI-ENGINE TRAINING II (2). LEC. 2.** Pr., AM 327, coreq., AM 427 and COI. Principles of personnel transportation in night and IFR operations; includes aircraft operations, flight planning, weather decision, and passenger relations.
432. **PRINCIPLES OF PROFESSIONAL FLIGHT (3). LEC. 3.** Pr., AM 305, 325 and COI. Advanced aircraft performance IFR operations, high altitude meteorology, and FAR part 135. Overview of industry opportunities and required qualifications.

433. **TRANSPORT AIRCRAFT FLIGHT TRAINING (1).** LAB. 3. Pr., AM 327, 427, 431, and COI. Includes instrument and night instruction, emergency procedures and actual air transportation operations. Preparation for Airline Transport Pilot Certification if otherwise qualified. Special fee.
435. **INSTRUMENT FLIGHT INSTRUCTOR TRAINING (2).** LEC. 1, LAB. 3. Pr., AM 429 and COI. Discussion, instruction, and arranged practice in instrument flight instruction in preparation for the FAA Instrument Instructor Certificate. Special fee.
437. **MULTI-ENGINE FLIGHT INSTRUCTOR TRAINING (2).** LEC. LAB. 3. Pr., AM 429 and COI. Principles and techniques of multi-engine flight instruction in preparation for FAA Multi-Engine Flight Instructor Rating. Special fee.
491. **SPECIAL PROBLEMS (VARIABLE CREDIT 1-5).** Pr., department approval. Individual student endeavor under faculty supervision involving special problems of an advanced nature in aviation management. May be taken more than once with a maximum credit of 10 hours.
492. **INTERNSHIP IN AVIATION MANAGEMENT. VARIABLE CREDIT (1-6).** Pr., departmental approval. Provides student with practical on-the-job training under supervision with aviation agencies. Written reports are required by designated faculty supervisor.

ADVANCED UNDERGRADUATE AND GRADUATE

551. **AEROSPACE SCIENCE (5).** A non-technical presentation of the principles and fundamentals of aviation and aerospace science, related systems, and related equipment. The course is primarily designed for students who require a general knowledge of aviation or aerospace science. It will include lectures by aerospace authorities and visits to aeronautical and aviation facilities. Not open to engineering students.

Biology (BI)

Coordinator and Assistant Professor Lawrence

For other staff and biology courses, see sections for Botany, Microbiology, and Zoology and Wildlife Science.

101. **PRINCIPLES OF BIOLOGY (5).** LEC. 4, LAB. 3. All quarters. Integrated principles of biology with emphasis on organic macro-molecules, bioenergetics, cell structure and function, heredity, evolution, and ecology. This course designed specifically for the science-oriented curriculum. Credit will not be allowed for both BI 101 and BI 105.
102. **PLANT BIOLOGY (5).** LEC. 4, LAB. 3. Pr., BI 101. All quarters. The morphology, physiology, relationships, distribution, and importance of plants. This course designed specifically for the science-oriented curriculum.
103. **ANIMAL BIOLOGY (5).** LEC. 4, LAB. 3. Pr., BI 101. All quarters. The morphology, physiology, relationships, distribution, and importance of animals. This course designed specifically for the science-oriented curriculum. Credit will not be allowed for both BI 103 and BI 106.
105. **PERSPECTIVES IN BIOLOGY (5).** LEC. 4, LAB. 2. All quarters. Principles of biology with emphasis on the relationship between man and modern biological science. Broad topics include cell biology, inheritance, evolution, and introduction to ecology. This course is designed specifically for the student satisfying a general education requirement in natural science. Cannot be used to meet major or minor requirements in biological science. Credit will not be allowed for both BI 101 and BI 105.
106. **HUMAN BIOLOGY (5).** LEC. 4, LAB. 1. Pr., BI 105 or 101. All quarters. Introductory human anatomy and physiology with emphasis on recent improvements in health care. This course is designed specifically for the student satisfying a general education requirement in natural science. Cannot be used to meet major or minor requirements in biological science. Credit will not be allowed for both BI 106 and BI 103.
107. **ENVIRONMENTAL BIOLOGY (5).** LEC. 5. Pr., BI 105 or 101. Fall, Winter, Spring. An introductory ecological approach to understanding man's impact and dependence on the natural environment. Broad topics include ecosystems, nutrient cycles, pollution, pest management, conservation of natural resources, energy, and human population. This course is specifically designed for the student satisfying a general education requirement in natural science. Cannot be used to meet major or minor requirements in biological science.

Botany and Microbiology (BMI)

Professors Cherry, Head, Davis, Lemke, McGuire, Peterson, Truelove, Weete, and Williams
Associate Professors Blevins, Brown, Cody, Dute, Freeman, and Kelley
Adjunct Associate Professor Stout
Assistant Professors Boyd, Campbell, Nielsen, Shands, and Shaw
Instructors Causey and Folkerts
Adjunct Instructors Corsby and Geiger

With few exceptions Principles of Biology, BI 101, and Plant Biology, BI 102, are prerequisite to all courses in this department. For a description of these and other general biology courses see the section for Biology (above). For additional offerings in microbiology consult the curriculum in Veterinary Medicine (VM), especially with reference to advanced courses in Pathobiology (VPB). A program in Biological Statistics (BST) is also administered through the Department of Botany and Microbiology.

BOTANY (BY)

306. **FUNDAMENTALS OF PLANT PHYSIOLOGY (5).** LEC. 3, LAB. 4. Pr., BI 102, CH 203 or 207 or equivalent. Fall, Winter. General aspects of fundamental life processes of plants involving physiological, structural, and environmental relationships.
320. **WEED IDENTIFICATION AND ECOLOGY (3).** LEC. 2, LAB. 3. Pr., BI 101-102 or equivalent. Spring. Identification of weeds in vegetative state. Weed distribution and environmental requirements. Field trips will be taken and weed collections will be required.
321. **FATE OF PESTICIDES IN THE ENVIRONMENT (3).** LEC. 2, LAB. 3. Pr., BI 101-102, CH 207 or equivalent. Spring. Pesticide absorption, translocation by plants and effects on plant processes. Behavior of herbicides in soils and effects on soil microorganisms. Mechanisms of herbicide inactivation and the basis for herbicide selectivity.
460. **SPECIAL PROBLEMS (1-3).** Pr., COI, senior standing. All Quarters. A. Anatomy; B. Ecology; C. Molecular Biology; D. Morphology; E. Physiology; F. Taxonomy. A student cannot register for more than three hours credit in any one quarter or in any one area.

ADVANCED UNDERGRADUATE AND GRADUATE

505. **INTRODUCTORY MYCOLOGY (5).** LEC. 3, LAB. 4. Pr., BI 101-102 or equivalent. Fall. A systematic survey of the fungi with emphasis on morphology. (Same course as PLP 505.)
506. **SYSTEMATIC BOTANY (5).** LEC. 3, LAB. 4. Pr., BI 101-102 or equivalent. Spring, Summer, Fall. Identification, classification, nomenclature, distribution and systematic relationship of the seed-bearing plants, utilizing primarily elements of the local flora as study material. The historical background, literature of plant taxonomy, and rules of nomenclature. Field trips will include an overnight week-end field trip.
507. **SALT MARSH ECOLOGY (6).** LEC. 4, LAB. 12. Pr., ten hours of biology including introductory botany. Summer. The botanical aspects of local marshes; includes plant identification, composition, structure, distribution and development of coastal marshes. Offered only at the Gulf Coast Research Laboratory. Ocean Springs, Miss.
509. **MARINE BOTANY (6).** LEC. 5, LAB. 12. Pr., ten hours of biology, including introductory botany, or COI. Summer. Survey, based upon local examples, of the principal groups of marine algae and maritime flowering plants, involving their structure, reproduction, distribution, identification, and ecology. Restricted to participants in the Gulf Coast Research Laboratory Teaching Session at Ocean Springs, Miss.
510. **COASTAL VEGETATION (4).** LEC. 3, LAB. 10. Pr., ten hours of biology, including introductory botany. Summer. General and specific aspects of coastal vegetation, with emphasis on local examples. Offered only at the Gulf Coast Research Laboratory. Ocean Springs, Miss.
513. **GENERAL PLANT ECOLOGY (5).** LEC. 3, LAB. 4. Pr., BY 306. Spring. Natural vegetation, environment, and interrelationships between the two with primary emphasis on the Southeastern United States. Field trips will be made, including an overnight week-end trip.
514. **BIOLOGICAL MICROSCOPY (5).** Lec. 2, LAB. 6. Pr., BI 102-103 or equivalent. Fall. Methods of tissue preparation for observation with the light microscope, including fixing, paraffin and plastic embedding, sectioning, general and cyto-chemical staining, and mounting. Squash techniques. Optical microscopy, micrometry, and photomicrography. Techniques for developing, printing, enlarging, and copying for photographic illustration. Preparation of 2 x 2 transparencies.
517. **MARINE BOTANY (6).** LEC. 8, LAB. 24, 4 days/5 weeks. Pr., BI 101-102 or equivalent. General survey of marine algae, vascular and non-vascular plants associated with the marine and estuarine environment. Structure, reproduction, identification, distribution, and ecology are considered. Offered only at Dauphin Island Sea Laboratory.
518. **MARSH ECOLOGY (6).** LEC. 8, LAB. 24, 4 days/5 weeks. Pr., advanced standing in biology. Floral and faunal elements of various marine marsh communities. Interaction of physical and biological factors will be emphasized. Structured to provide actual field experience. Trips scheduled to acquaint students with examples of marsh types. Offered only at Dauphin Island Sea Laboratory.
535. **PLANT DEVELOPMENT: CELLS AND TISSUES (5).** LEC. 3, LAB. 4. Pr., BI 101-102 or equivalent. Fall, even years. The structure and development of plant tissues and their constituent cells. Such topics as the ontogeny of vascular tissue, the structural basis of cellular communication, and the functional anatomy of plant surfaces will be explored through the use of light and scanning electron microscopy.
536. **PLANT DEVELOPMENT: ORGANS (5).** LEC. 3, LAB. 4. Pr., BI 101-102 or equivalent. Winter, odd years. Comparative anatomy of vascular plants with emphasis on structural and developmental relationships of the vegetative and reproductive organs of seed plants. A review of current anatomical, experimental and ultrastructural research of roots, stems, leaves, and flowers.
554. **PHYSIOLOGY OF FUNGI (5).** LEC. 3, LAB. 4. Pr., BY 505 and one of the following: MB 300, BY 306, or ADS (CH) 518 or COI. Spring, odd years. Cellular structure, function, nutrient requirements and absorption, metabolism during the vegetative growth cycle, spore germination and spore formation, mode of action of agriculturally important fungicides, and the physiology of fungal-induced plant pathogenesis.

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604. **ADVANCED PLANT PHYSIOLOGY I (5).** LEC. 3, LAB. 4. Pr., BY 306 and 10 hours of organic chemistry. Fall. Molecular biology and plant metabolism; a correlation of the fine structures of the cell with metabolic pathways occurring therein.
605. **ADVANCED PLANT PHYSIOLOGY II (5).** LEC. 3, LAB. 4. Pr., BY 604 and COI. Winter. Water relations and mineral nutrition. Internal and external factors affecting the absorption, translocation, utilization, and loss of water and mineral elements by green plants.

606. **ADVANCED PLANT PHYSIOLOGY III (5). LEC. 3, LAB. 4.** Pr., BY 604 and COI. Spring. Plant growth. A review of literature and laboratory methodology of plant physiological subject matter in the areas of plant growth regulators, mode of action of growth regulators, and factors affecting plant growth.
607. **ULTRASTRUCTURE OF PLANT CELLS AND MICROBES (5). LEC. 3, LAB. 4.** Pr., COI. Winter. Subcellular construction of plant cells, fungi, and bacteria. Laboratory experience in the use of transmission and scanning electron microscopes will supplement lecture material.
608. **ADVANCED SYSTEMATIC BOTANY (5). LEC. 2, LAB. 6.** Pr., BY 506. Fall. Experimental and research aspects of the taxonomy of vascular plants. The literature, techniques and methodology relative to the identification and biosystematic classification of evolutionary units; intensive study of special groups of plants and the application of resultant data to specific taxonomic problems.
616. **CYTOLOGY AND CYTOGENETICS (5). LEC. 3, LAB. 4.** Pr., ZY 300. Winter. Cell structure and function with emphasis on cell reproduction and factors contributing to the evolution of organisms.
625. **SPECIAL PROBLEMS (CREDIT TO BE ARRANGED).** A. Anatomy; B. Chemical Weed Control; C. Cytology; D. Ecology; E. General Biology Teaching; F. Marine Botany; G. Morphology; H. Physiology; I. Taxonomy; J. Ultrastructure.
626. **ADVANCED MYCOLOGY I (5). LEC. 2, LAB. 6.** Pr., BY 505 and COI. Spring, even years. Classification of fungi and lichens. Detailed studies of selected families of Ascomycetes and Fungi Imperfecti. Interpretation of comparative morphological criteria and ontogenic patterns as a guide to phylogeny. Intensive floristic investigations of particular habitats. (Same course as PLP 626.)
627. **ADVANCED MYCOLOGY II (5). LEC. 2, LAB. 6.** Pr., 505 and COI. Spring, odd years. Classification of fungi. A detailed survey of the Myxomycetes, Phycomycetes, and Basidiomycetes. Special emphasis will be placed on ecological aspects of fungi in freshwater and forest habitats. Fungal genetics will be studied. (Same course as PLP 627.)
640. **DEPARTMENTAL FORUM (1).** Required of all majors, open to all minors. May be taken more than one quarter. Fall, Winter, Spring. Discussions concerning current topics in the various sciences and related fields.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
725. **SPECIAL PROBLEMS (CREDIT TO BE ARRANGED.)** A. Anatomy; B. Chemical Weed Control; C. Cytology; D. Ecology; E. General Biology Teaching; F. Marine Botany; G. Morphology; H. Physiology; I. Taxonomy; J. Ultrastructure.
740. **DOCTORAL SEMINAR (1).** Required of doctoral students. May be taken more than one quarter. Fall, Winter, Spring. Oral presentation and discussion of research in the field of specialization.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

MICROBIOLOGY (MB)

201. **PERSPECTIVES IN MICROBIOLOGY (5). LEC. 4, LAB. 3.** Pr., BI 101 or 105. Winter. Survey of microbiology directly affecting human affairs. Basic biology of bacteria, fungi and viruses. Special attention given to recognition and control of infectious agents, epidemiology, food handling procedures, sanitation, and other aspects important to human health. This course will not satisfy a curriculum requirement for MB 300 or 302. Cannot be used to meet major or minor requirements in biological science.
300. **GENERAL MICROBIOLOGY (5). LEC. 3, LAB. 4.** pr., BI 101, CH 203 or 207. Fall, Spring, Summer quarters. Fundamentals of microbiology including history of microbiology, cell structure, chemical composition, growth, nutrition, metabolism, genetics, classification, cultivation, and distribution of bacteria, viruses, rickettsia, and fungi; discussion of the effects of chemical and physical agents on the growth of microorganisms. Credit in this course precludes credit for MB 302.
302. **MEDICAL MICROBIOLOGY (5). LEC. 3, LAB. 4.** Pr., BI 101, CH 203 or 207. Spring. Etiology, epidemiology, immunity, identification and pathogenesis of microorganisms of medical importance to man. Credit in this course precludes credit for MB 300. A similar statement is shown for MB 300 above.
400. **MICROBIOLOGICAL METHODS (5). LEC. 2, LAB. 6.** Pr. MB 300, junior standing. Spring. The instrumental methods used in physical and biochemical analyses of microorganisms and their metabolic products.
446. **CLINICAL AND PATHOGENIC MICROBIOLOGY (5). LEC. 2, LAB. 6.** Pr., MB 300, junior standing. Fall. Isolation, cultivation, identification, classification and pathogenesis of infectious agents, including clinical materials: Mycoplasmata (PPO), Rickettsiae, and Spirochaetes.
460. **SPECIAL PROBLEMS (1-3).** Pr., COI senior standing. All Quarters. A. Applied Microbiology; B. Diagnostic Microbiology; C. Immunology; D. Microbial Ecology; E. Microbial Physiology; F. Microbial Taxonomy; G. Molecular Biology; H. Virology. A student cannot register for more than 3 hours credit in any one quarter or in any one area.

ADVANCED UNDERGRADUATE AND GRADUATE

503. **BACTERIAL TAXONOMY (5). LEC. 3, LAB. 4.** Pr., MB 300. Winter. International Code of Nomenclature of bacteria. The development of microbiological literacy; classification of taxa based on phylogeny, molecular and numerical concepts.
504. **INDUSTRIAL MICROBIOLOGY (3). LEC. 3, Pr., MB 300.** Spring. Principles and practices of microbiologists in industry areas surveyed to include manufacture of fermented foods, alcoholic beverages, antibiotics, amino acids, enzymes, and single-cell protein.
508. **MARINE MICROBIOLOGY (7½). LEC. 5, LAB. 12.** Pr., MB 300 and COI. Summer. Introduces the student to the role of microorganisms in the oceans and estuaries. Special emphasis on bacteria and fungi. Lecture and laboratory work includes sampling procedures, taxonomy of marine bacteria, mineralization, microbial fouling, pollution, and diseases of marine animals. Offered only at the Gulf Coast Research Laboratory, Ocean Springs, Miss.

521. **INDUSTRIAL MICROBIOLOGY LABORATORY (3).** LAB. 6. Pr., MB 504. Summer. Methods for production, detection, purification of microbial products, and one or more projects on fermentations or industrial processes of special interest to the student.
522. **GENE EXPRESSION AND RECOMBINANT DNA (5).** LEC. 3, LAB. 4. Pr., BI 101 and 102, MB 300, ZY 300. Spring. Structure and function of genes; concepts and techniques in recombinant DNA.
540. **MICROBIAL PHYSIOLOGY AND GENETICS (3).** LEC. 3. Pr., MB 300, CH 203 or 207. Fall. Cellular structure, function, nutritional requirements, energy metabolism, growth cycles, active transport mechanisms, biosynthesis, and mutation and genetics.
541. **ENVIRONMENTAL MICROBIOLOGY (5).** LEC. 3, LAB. 4. Pr., MB 300. Spring, odd years. Theory and application of fundamental principles of microbiology, ecology, diversity, and biochemistry of microorganisms in their environments.
542. **GENERAL VIROLOGY (5).** LEC. 3, LAB. 4. Pr., MB 300, and ZY 300 or equivalent. Fall. The molecular biology of bacterial, plant, and animal viruses; pathogenesis, diagnosis, and cultivation.
543. **IMMUNOLOGY (4).** LEC. 4. Pr., MB 300, junior standing. Winter. Immunobiology and immunochemistry of humoral and cellular mechanisms of immunity.
- 543L. **IMMUNOLOGY LABORATORY (2).** LAB. 4. Pr., MB 543 or currently enrolled. Winter. Laboratory exercises in immunology.
545. **MICROBIAL PHYSIOLOGY LABORATORY (3).** LAB. 6. Pr., MB 540. Winter. Laboratory experiments conducted on instrumentation, staining mechanisms, protoplast formation, cellular function. Warburg respirometry. Nephelometry, bioassay, U.V. light irradiation and photoreactivation, mutation, antibiotic sensitivity, and ultrasonic rupture of organisms.
556. **FOOD MICROBIOLOGY (5).** LEC. 3, LAB. 4. Pr., MB 300. Spring. Relationship of habitat to the occurrence of microorganisms on food, environment affecting the growth of various microorganisms in food; microbiological action in food spoilage and food manufacture; physical, chemical and biological destruction of microorganisms in foods; microbiological examination of foodstuffs; and public health and sanitation microbiology.

GRADUATE

609. **BIOMEMBRANES (4).** LEC. 4. Pr., CH 518 and 519. Winter, odd years. Discussion of the structure and function of biological membranes. Experimental and theoretical aspects of membrane structure, isolation, and characterization of membrane components will be presented. Microbial and plant membrane systems will be emphasized.
610. **ADVANCED MICROBIAL PHYSIOLOGY (5).** LEC. 2, LAB. 6. Pr., MB 540, CH 518. Spring, even years. Physiology of microorganisms; energy transfer mechanisms, metabolism, sexuality and mutation.
611. **BIOTECHNICAL GENETICS (5).** LEC. 4, LAB. 2. Pr., ZY 300 and MB 522 or ZY 519. Spring, odd years. Alteration of genetic information in microorganisms and in cell lines of higher organisms, including the application of recombinant DNA methodology as well as conventional genetic approaches to the development of products and biological processes related to industry and agriculture.
613. **MICROBIAL DIVERSITY (5).** LEC. 2, LAB. 6. Pr., MB 503. Summer, odd years. Probe into microbial diversity, systematics, and behavior in natural environments.
624. **PHYTOBACTERIOLOGY (5).** LEC. 2, LAB. 6. Pr., MB 300. Spring. Experimental and theoretical aspects of isolation, identification, pathogenicity, and infectivity of plant pathogenic bacteria.
625. **SPECIAL PROBLEMS. (CREDIT TO BE ARRANGED.)** A. Clinical Microbiology; B. Experimental Microbiology; C. Industrial Microbiology; D. Medical Virology; E. Microbial Ecology; F. Microbial Physiology; G. Microbial Taxonomy; H. Molecular Genetics; I. Mycotoxicology; J. Serology; K. Virology.
640. **DEPARTMENTAL FORUM (1).** Required of all majors, open to all minors. May be taken more than one quarter. Fall, Winter, Spring. Discussions concerning current topics in the various sciences and related fields.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
725. **SPECIAL PROBLEMS (CREDIT TO BE ARRANGED.)** A. Clinical Microbiology; B. Experimental Microbiology; C. Industrial Microbiology; D. Medical Virology; E. Microbial Ecology; F. Microbial Physiology; G. Microbial Taxonomy; H. Molecular Genetics; I. Mycotoxicology; J. Serology; K. Virology.
740. **DOCTORAL SEMINAR (1).** Required of doctoral students. May be taken more than one quarter. Fall, Winter, Spring. Oral presentation and discussion of research in the field of specialization.
799. **DOCTORAL RESEARCH AND DISSERTATION. (CREDIT TO BE ARRANGED.)**

BIOLOGICAL STATISTICS (BST)

210. **MICROCOMPUTER APPLICATIONS IN AGRICULTURE (3).** LEC. 2, LAB. 3. Pr., 10 hours of mathematics. All Quarters. Introduction of microcomputer technology to increase understanding of the use of computer decision aids in agricultural careers; microcomputer hardware including microprocessor, display, keyboard, data storage and retrieval, printer and communication options; microcomputer software including languages, electronic spreadsheet, word processing, data based management, and programmed products; and microcomputer interface with data source and processing systems. (Same as AEC 210).
215. **INTRODUCTORY BIOLOGICAL STATISTICS (5).** LEC. 4, LAB. 2. Pr., MH 160. Fall, Winter. Elementary statistics as applied to agriculture and biology including an introduction to empirical frequency distributions, descriptive statistics, elementary probability, sampling, estimation, testing hypotheses, linear regression, correlation, and the analysis of variance.

216. **INTRODUCTORY BIOLOGICAL COMPUTATIONS (3).** LEC. 3. Pr., sophomore level. Winter, Spring. Introductory use of the computer for agricultural and biological computations and data reduction. Introduction to FORTRAN programming and to effective and valid use of available program packages in biology.
313. **SAMPLING I (4).** LEC. 3, LAB. 3. Pr., MH 163, Fall, Winter. Basic concepts and procedures of statistical sampling as applied to forest resource assessment and management. (Same as FY 313.)

ADVANCED UNDERGRADUATE AND GRADUATE

501. **BIOLOGICAL STATISTICS (5).** LEC. 4, LAB. 2. Pr., MH 161, Fall, Winter, Spring. Basic concepts of experimental statistics, distributions, confidence limits, tests of significance, analysis of variance, linear correlation and regression. For advanced undergraduates and as a beginning course for graduate students in biological sciences.
511. **SAS PROGRAMMING (2).** LEC. 2. Pr., BST 501 or equivalent and BST 216 or equivalent. Fall, Spring. Introduction to statistical analysis and management of data files using SAS, The Statistical Analysis System. Data entry and management will be emphasized along with selection and execution of the important statistical procedures.

GRADUATE

601. **BIOLOGICAL STATISTICS II (5).** LEC. 4, LAB. 2. Pr., BST 501 or equivalent. Winter. Analysis of variance, randomized block, Latin square and split plot designs, factorials, analysis of covariance, and multiple regression.
602. **LEAST SQUARES ANALYSIS OF EXPERIMENTS (5).** LEC. 4, LAB. 2. Pr., BST 501 and 601 or equivalent. Spring, even years. Analysis and interpretation of experimental data by least squares procedures; general linear models and hypotheses; weighted regression; irregular two-factor design.
625. **SPECIAL PROBLEMS (CREDIT TO BE ARRANGED.)** Pr., COI. All Quarters. A. Biological Statistics; B. Statistical Genetics.

Building Science (BSC)

Professors Brandt, Head, Aderholdt

Associate Professors Lechner, Mol, and Williams

Assistant Professors Cooper, Hein, Huston, Killingsworth, Love, and Weiss

Instructors Burleson and Cook

- 161-162. **HISTORY OF BUILDING I—II (3-3).** Development and use of construction methods and materials showing the effects on building from ancient to contemporary times.
200. **DRAWING & PROJECTIONS (3).** LEC. 2, LAB. 3. Pr., sophomore standing. Basic architectural drafting techniques.
202. **MATERIALS OF CONSTRUCTION (5).** Pr., MH 160 and sophomore standing. A survey of common building materials.
203. **WORKING DRAWINGS AND SPECIFICATIONS (4).** LEC. 2, LAB. 6. Pr., BSC 200 or IE 102 or AR 101 and BSC 202. Graphic construction communications; understanding and/or producing working drawings, shop drawings, and specifications.
204. **CONSTRUCTION SYSTEMS (3).** Pr., Sophomore standing. Construction systems for buildings.
211. **MECHANICS OF STRUCTURES (5).** Pr., MH 161, PS 205. Principles of mechanics as applied to building construction; resolution of external forces: analysis of trusses; shear and bending moments.
311. **STRENGTH OF MATERIALS (5).** Pr., BSC 211 and junior standing in AR or BSC (no PAR or PBSC). Strength of materials of structural members. Lectures, problems.
314. **REINFORCED CONCRETE (5).** Pr., BSC 311. Reinforced concrete. Lectures, research and problems.
315. **APPLIED STRUCTURES (5).** Pr., BSC 314. Applied design of beams and columns in wood and steel.
323. **FOUNDATIONS & SOILS (3).** Pr., BSC 311. Soil conditions and their effects on building foundations.
324. **CONSTRUCTION SURVEYING (3).** LEC. 2, LAB. 3. Pr., junior standing in BSC, AR, or IA. Surveying techniques, topography and dimensional controls for buildings.
325. **TEMPORARY STRUCTURES (3).** Pr., BSC 311. Design of formwork and temporary structures in construction.
340. **CONSTRUCTION SAFETY AND HEAVY EQUIPMENT (3).** Pr., BSC classification. Construction operations safety and heavy equipment used in construction.
351. **ENERGY AND BUILDINGS (3).** Pr., junior standing. (no PAR or PBSC). A survey of the effects of climate, design, materials, and systems on the energy consumption of buildings. Various energy sources (solar, etc.) will be investigated.
- 352-353. **BUILDING EQUIPMENT I-II (3-3).** Pr., PS 207. (no PAR or PBSC). Analysis of heating, air conditioning, water supply, plumbing and electrical systems as related to buildings. Lectures, readings, problems.
371. **COMPUTERS IN CONSTRUCTION (3).** Pr., junior standing in BSC. Use of the computer for word processing and construction business applications.
399. **EXPERIENTIAL LEARNING (2-5).** Pr., sophomore standing and COI. May be repeated once for credit. Students may obtain academic credit for participation in learning experiences of a practical nature outside the normal curricular offerings of the University. Graded S-U.
- 405-406. **CONTRACTING BUSINESS I-II (3-3).** Pr., senior standing in BSC (no pre-BSC). Organizing, managing, and operating the contracting firm.
421. **CONSTRUCTION ESTIMATING I (5).** LEC. 4, LAB. 3. Pr., senior standing in BSC (no pre-BSC). Detailed estimating of building component quantities.
431. **CONSTRUCTION ESTIMATING II (5).** LEC. 4, LAB. 3. Pr., BSC 421. Estimating direct and indirect construction costs.

434. **CONSTRUCTION SCHEDULING (5).** Pr., BSC 421 and senior standing. Management techniques for planning, scheduling, controlling costs, and leveling manpower by use of CPM.
460. **SPECIAL PROBLEMS (CREDIT 1-5).** Pr., department head approval, junior standing. Development of an area of concentration through independent study under staff supervision.
490. **TERMINAL PROJECT (8), LEC. 2, LAB. 15.** Pr., BSC 405 and 431, final quarter prior to graduation. Cost Analysis and Construction Program for a building or special study (each as approved by the Faculty Committee). Construction program to include all documents required by the Contract and/or necessary to construct the project. Candidate will defend project orally before staff and guest specialists.

Chemical Engineering (CHE)

Professor Chambers, *Head*, Baker, Guin, Lee, Neuman, and Tarrer
 Associate Professors Hirth, Roos, and Tatarchuk
 Assistant Professors Curtis, Krishnagopalan, and Placek
 Adjunct Professors Emert and Hart

General Curriculum (GC) students (those with undeclared majors) may enroll only with departmental consent.

101. **INTRODUCTION TO CHEMICAL ENGINEERING I (1).** Pr., high school chemistry. The role of the chemical engineer in various industrial process industries.
102. **INTRODUCTION TO CHEMICAL ENGINEERING II. (1).** Pr., high school chemistry. Role of the chemical engineer in various process industries. Industries not addressed in CHE 101 are considered.
210. **MATERIAL BALANCES (3).** Pr., CH 112 or 104. Application of principles of material balances to chemical processes.
211. **ENERGY BALANCES (4).** Pr., CHE, 210. Energy balance principles and calculations in processes involving physical changes and chemical reactions. Computer applications.
213. **DIGITAL COMPUTERS IN CHEMICAL ENGINEERING (4).** Pr., MH 162. WATFIV and VSFORTRAN languages. Use of TSO, SPF, and IOF on IBM mainframe computer. Structured programming methods. Introduction to Chemical Engineering Subroutine Library.
310. **PULP AND PAPER TECHNOLOGY (3).** Pr., junior standing. An overview course in pulp manufacturing, bleaching, papermaking, coating, and printing.
336. **CHEMICAL ENGINEERING THERMODYNAMICS I (4).** Pr., MH 163, CHE 210. Coreq., CHE 211. First and second laws of thermodynamics, non-ideal gases, heat engines, refrigeration, and liquefaction.
337. **CHEMICAL ENGINEERING THERMODYNAMICS II (4).** Pr., CHE 336. Thermodynamics of phase and chemical equilibrium.
361. **FLUID MECHANICS (4).** Pr., PS 220. Coreq., MH 265, CHE 211 or CHE 336. Includes conservation equations, fluid statics, dimensional analysis, design calculations for conduits, and introduction to rheology, boundary layer theory, compressible fluid flow, flow measurement, and turbomachinery.
362. **HEAT TRANSFER (4).** Pr., CHE 361, CHE 211 or 336, MH 265. Heat transfer via conduction and convection, heat exchanger design, evaporation.
363. **MASS TRANSFER (4).** Pr., CHE 362. Mass transfer fundamentals and applications of mass transfer principles to the design of gas absorption, drying, and humidification equipment.
366. **STAGewise OPERATIONS (4).** Pr., CHE 211, 213. Principles, design, and industrial applications of stagewise processes such as extraction and distillation.
370. **CHEMICAL REACTION ENGINEERING (4).** Pr., MH 265, CHE 336. Design of chemical reactors with homogeneous reaction systems.
382. **CHEMICAL ENGINEERING LABORATORY I (3).** LEC. 1, LAB. 6. Pr., CHE 213, 336, 361, 362. Industrial chemical engineering equipment. Experimental study of heat and momentum transfer and other topics.
401. **COAL PROCESSING TECHNOLOGY (3).** Structure, properties, chemistry and utilization of coal.
402. **SOLAR THERMAL PROCESSES (3).** Pr., CHE 362. Solar energy fundamentals, solar heat transfer, solar heating devices.
410. **PULP AND PAPER PROCESSING LABORATORY (3).** LEC. 1, LAB. 6. Pr., CHE 310 or 501, 382, and senior standing or COI. Experimental study of pulping and paper making operations.
444. **PROCESS DESIGN PRACTICE (2).** LAB. 6. Pr., CHE 213. Coreq., CHE 545. Case studies in the application of chemical principles to process synthesis and equipment design.
447. **COMPUTER-AIDED PROCESS DESIGN (3).** LEC. 1, LAB. 6. Pr., CHE 444, 545, 546. Case studies in process design.
450. **SPECIAL TOPICS IN CHEMICAL ENGINEERING. (CREDIT TO BE ARRANGED WITH A MAXIMUM OF 10 HOURS.)** Topical courses in special areas. May include laboratory work. May be taken more than once.
457. **MICROCOMPUTER PROCESS DESIGN IN PULP AND PAPER INDUSTRY (3).** LEC. 2, LAB. 3. Pr., CHE 444, 545, 556. Application of process simulation to problems encountered in the pulp and paper industry. Design of pulp and paper unit operations and processes.
461. **TRANSPORT PHENOMENA (3).** Pr., MH 265, CHE 210. Momentum, heat, and mass transport in one-dimensional non-turbulent systems.

470. **UNDERGRADUATE SEMINAR (1)**, Pr., senior standing or COI. Lectures on current topics in chemical engineering.
479. **HONORS THESIS (3-6)**, Pr., junior standing, COI. For honors program students only. Repeatable once for a maximum total of 6 hrs.
486. **CHEMICAL ENGINEERING LABORATORY II (3)**, LEC. 1, LAB. 6. Pr., CHE 362, 363, 366, 382. Experimental study of mass transfer and stagewise operations.
487. **CHEMICAL ENGINEERING LABORATORY III (3)**, LAB. 9. Pr., senior standing or COI. Comprehensive open-ended projects.
490. **DIRECTED READING (1)**, Pr., COI. Supervised study.
499. **UNDERGRADUATE RESEARCH (3)**, Pr., junior standing, COI, GPA above 3.0. Individual and small group projects. May be taken twice for credit.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **INTRODUCTION TO PULP AND PAPER TECHNOLOGY (3)**, Pr., CH 104 or 112 or equivalent and junior standing or COI. An introductory course on the technology of pulp and paper manufacturing with emphasis on raw materials, pulping, bleaching, paper making, coating, and printing. Designed for students with no previous formal pulp and paper training. Research paper.
510. **PULP AND PAPER ENGINEERING (3)**, Pr., CHE 310 or 501, 363 or COI, CH 208. Coreq., FP 47B and senior standing. Chemical and engineering principles in the manufacture of pulp and paper.
512. **SURFACE AND COLLOID SCIENCE (3)**, Pr., CH 508 and senior standing or COI. Fundamentals of surface and colloid science with applications to foams, emulsions, thin films, froth floatation, detergency, biological phenomena, paper making, and tertiary oil recovery.
- 512L. **SURFACE AND COLLOID SCIENCE LABORATORY (1)**, LAB. 3. Pr., CHE 411. Coreq., CHE 512. Modern experimental techniques of surface and colloid science with applications to pulping and paper making.
515. **COMPUTER APPLICATIONS IN CHEMICAL ENGINEERING (4)**, Pr., CHE 361. Application of computer software to solve chemical engineering problems. Problems of practical importance in areas of chemical production and design are selected to demonstrate the features of the computer languages considered.
516. **PROCESS DYNAMICS AND CONTROL (4)**, Pr., CHE 213, 366, 370, 382, PS 221, EE 302. Mathematical modeling and dynamic analysis of chemical processes. Feedback control, stability, and frequency response of linear, single variable systems.
517. **DIGITAL PROCESS CONTROL (4)**, Pr., CHE 516. Analysis and design of computer controlled systems. Advanced topics in process control; feedforward control, cascade control, multivariable control, compensation control, and others.
518. **PROCESS DYNAMICS AND CONTROL LABORATORY (2)**, LAB. 6. Coreq., CHE 517. Laboratory experiments in classical and computer control. Computer simulation of control systems. Demonstration and practice of theory taught in CHE 516 and 517.
519. **ADVANCED TOPICS IN COMPUTER CONTROL SYSTEMS (4)**, Pr., CHE 515, 517, or COI. Introduction to the fundamental concepts related to the control of chemical processes using digital computers.
540. **NUCLEAR ENGINEERING (5)**, Pr., PS 305 or 320, MH 265, or COI. Atomic physics and nuclear reactions. Nuclear reactor principles, design and engineering, including radiation, shielding, instrumentation, and heat transfer.
543. **BUSINESS ASPECTS OF CHEMICAL ENGINEERING (3)**, Pr., senior standing or COI. The flow of materials and money through the chemical processing industries; marketing; relationships with investors, employees, customers, competitors, suppliers, governments, and the public.
545. **PROCESS ECONOMICS AND DESIGN (3)**, Pr., CHE 337, 362, 366, 370. Fundamentals and applications of process economics and design. Computer-aided cost estimation and profitability analysis.
546. **COMPUTER-AIDED PROCESS SIMULATION (4)**, LEC. 2, LAB. 6. Pr., CHE 337, 545, or COI. Fundamentals and applications of computer-aided process simulation. Case studies.
556. **MICROCOMPUTER PROCESS SIMULATION IN PULP AND PAPER INDUSTRY (3)**, LEC. 2, LAB. 3. Pr., CHE 510, 515, 545, or COI. Fundamentals of microcomputer process simulation with applications to the pulp and paper industry. Design of pulp and paper unit operations and small scale processes using spreadsheet programs and commercial simulation software.
560. **INTRODUCTION TO PLASTICS (3)**, Pr., CH 208 or COI. High polymers. Includes the chemistry, technology, and uses of cellulose, phenolics and amino plastics, polyolefins, vinyls, styrene, acrylics, polyesters, epoxies, polyamides, polyurethanes, silicones, and rubbers.
565. **HAZARDOUS MATERIALS MANAGEMENT (4)**, Pr., CHE 363, 370, or COI. Fundamental principles and regulatory information related to hazardous materials management and engineering.
575. **RATE PROCESSES IN MATERIALS (3)**, Pr., CH 508 or COI. Diffusion in the gas, liquid and solid phases and the fundamentals of chemical reaction kinetics pertinent to the crystallization and transformation of materials.
585. **AIR QUALITY ENGINEERING (4)**, Pr., CHE 363. Sources and chemical nature of air pollutants. Principles of mass transfer as related to the removal of air pollutants. Design calculations and engineering of air pollution control equipment including absorption and adsorption processes.
594. **BIOSEPARATIONS (3)**, LEC. 3, Pr., CHE 363, 366. Fundamentals of commercial scale purification techniques for biologically produced materials.
595. **BIOCHEMICAL ENGINEERING (3)**, Coreq., CHE 370. Kinetics and process analysis for biochemical and biological processes. Introductory cell biochemistry.

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600. **CHEMICAL ENGINEERING ANALYSIS I (3).** Pr., graduate standing. Mathematical analysis of chemical engineering problems to include the formulation of differential equations, analytical and numerical techniques for problem solution, data correlation and analysis, and computer applications.
610. **TRANSPORT PHENOMENA I (3).** Coreq., CHE 600. Principles of momentum, heat, and mass transport in nonturbulent systems.
611. **TRANSPORT PHENOMENA II (3).** Pr., CHE 610. A continuation of CHE 610 with applications to turbulent systems.
620. **CHEMICAL ENGINEERING THERMODYNAMICS I (3).** Pr., graduate standing. Properties of real gases and liquids, chemical and phase equilibrium.
625. **REACTION ENGINEERING I (3).** Pr., CHE 610. Analysis and design of chemical reactors.
632. **PROCESS MODELING AND SIMULATION (3).** Pr., CHE 600. Mathematical modeling of chemical process systems. Process simulation with digital simulation languages.
640. **DISTILLATION (3).** Pr., COI, graduate standing. Design principles for multicomponent, extractive, azeotropic, and other complex distillation processes.
641. **ABSORPTION AND EXTRACTION (3).** Pr., COI, graduate standing. Design principles for gas absorption and extraction processes.
642. **HEAT TRANSFER (3).** Pr., COI, graduate standing. Analysis and design principles for advanced heat transfer processes, with special emphasis on two phase heat transfer in reaction systems, packed beds, and other process equipment.
645. **POLYMER ENGINEERING (3).** Pr., COI, graduate standing. Structure of polymers, molecular forces and properties, polymer formation and modification, kinetics of polymerization, polymer technology and applications.
646. **PROCESS ECONOMICS (3).** Pr., COI, graduate standing. Venture analysis, project justification, cost estimation, and project engineering.
647. **CHEMICAL-PHYSICAL TREATMENT OF WASTE WATER (3).** Pr., CHE 363, 370. Principles of chemical oxidation, adsorption, flocculation and coagulation, and ion exchange as applied to the treatment of waste water.
650. **SPECIAL TOPICS IN CHEMICAL ENGINEERING (CREDIT TO BE ARRANGED.)** Pr., COI, departmental approval. May be taken more than one quarter.
670. **SEMINAR (1).** Pr., graduate standing. May be taken more than one quarter.
690. **DIRECTED READING IN CHEMICAL ENGINEERING (CREDIT TO BE ARRANGED.)** Pr., departmental approval. May be taken more than one quarter.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
701. **CHEMICAL ENGINEERING ANALYSIS II (3).** Pr., CHE 600. Numerical methods for the solution of chemical engineering problems. Computer application.
721. **CHEMICAL ENGINEERING THERMODYNAMICS II (3).** Pr., CHE 620. Phase equilibrium of non-electrolytes.
722. **ENGINEERING STATISTICAL THERMODYNAMICS I (3).** Pr., CHE 620. Fundamentals of statistical mechanics, partition functions, chemical equilibrium.
723. **ENGINEERING STATISTICAL THERMODYNAMICS II (3).** Pr., CHE 622. Applications of molecular theory and models to the properties of real gases and liquids.
726. **REACTION ENGINEERING II (3).** Pr., CHE 625. A continuation of CHE 625.
727. **HETEROGENEOUS CATALYSIS (3).** Pr., COI, graduate standing. Surface reactions, catalytic processes, catalyst characterization methods.
730. **PROCESS DYNAMICS AND CONTROL I (3).** Coreq., CHE 600. Advanced linear control system analysis and an introduction to nonlinear systems.
731. **PROCESS DYNAMICS AND CONTROL II (3).** Pr., CHE 600. An introduction to modern control theory with emphasis on chemical reactors and stagewise processes.
733. **OPTIMIZATION (3).** Pr., COI. Analytical and numerical optimization techniques. Maxima and minima of functions of several variables, constraints, linear and non-linear programming methods.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Chemistry (CH)

Professors Hargis, Head, Aull, Friedman, Hill, Melius, Neely,
Shevlin, Ward, and Worley

Associate Professors Dinius, Donnelly, F. Johnson, Kohl, Livant, McKee,
Parish, Perry, Stanbury, Squillacote, and Webb

Assistant Professors Illies and Love,

Adjunct Instructors J. Johnson and Reynolds

Chemistry Laboratory fee per course per quarter is \$20.00. This additional fee applies to CH 103L, 104L, 105L, 111L, 112L, 113L, 207L, and 208L. After the tenth day of classes each quarter a Late Fee of \$10.00 in addition to the \$20.00 Laboratory Fee will be assessed. The Laboratory Fee is not refundable after the tenth class day.

101. **INTRODUCTORY CHEMISTRY I (2).** LEC. 3. Pr. or Coreq., MH 140, 160, or 161. To acquaint science students with the classifications of matter and the manner in which the chemist identifies matter and records the nature of its changes. Atomic structure, chemical bonding, molecular aggregations and the laws summarizing the properties and nature of the physical states of matter are considered.
102. **INTRODUCTORY CHEMISTRY II (2).** LEC. 3. Pr., CH 101, Coreq., CH 103L. A continuation of the topics described under CH 101.
103. **FUNDAMENTALS OF CHEMISTRY I (4).** LEC. 4. Pr., high school chemistry. Coreq., MH 160 or 161; CH 103L. Encompasses the subject matter of CH 101 and 102 for the superior student with adequate background preparation. Departmental approval is required for admission to this course.
- 103L. **GENERAL CHEMISTRY LABORATORY (1).** LAB. 3. Coreq., CH 102 or 103. The basic laboratory techniques to experimental measurements, and to the interpretation of data.
104. **FUNDAMENTALS OF CHEMISTRY II (4).** LEC. 4. Pr., CH 103 or 102, Coreq., CH 104L. A continuation of CH 102 or CH 103. The methods of preparation and the reactions of individual as well as classes of chemical compounds are used to study and illustrate the mechanism and dynamics of chemical change.
- 104L. **GENERAL CHEMISTRY LABORATORY (1).** LAB. 3. Pr., CH 103L, Coreq., CH 104. A continuation of CH 103L.
105. **FUNDAMENTALS OF CHEMISTRY III (4).** LEC. 4. Pr., CH 104, Coreq., CH 105L. Solution chemistry including various ionic equilibria, coordination compounds, acid-base phenomena and redox processes. Quantitative analytical problem-solving will be emphasized.
- 105L. **GENERAL CHEMISTRY LABORATORY (1).** LAB. 3. Coreq., CH 105. A continuation of CH 103L and CH 104L.
111. **GENERAL CHEMISTRY (4).** Coreq., MH 160 or 140, or 161. Also 111L. For chemistry majors and others in closely related areas. Credit in CH 101, 102 or 103 precludes credit for this course.
- 111L. **GENERAL CHEMISTRY LABORATORY (1).** LAB. 3. Coreq., CH 111. The basic laboratory techniques to experimental measurements and to the interpretation of data.
112. **GENERAL CHEMISTRY (4).** Pr., CH 111 or 103. Coreq., 112L. Continuation of CH 111. Credit in CH 104 precludes credit for this course.
- 112L. **GENERAL CHEMISTRY LABORATORY (1).** LAB. 3. Pr., 111L. Coreq., CH 112. A continuation of CH 111L.
113. **GENERAL CHEMISTRY (4).** Pr., CH 112. Coreq., 113L. Continuation of CH 112. Credit in CH 105 precludes credit for this course.
- 113L. **GENERAL CHEMISTRY LABORATORY (1).** LAB. 3. Pr., 112L. Coreq., CH 113. A continuation of CH 112L.
203. **ORGANIC CHEMISTRY (5).** Pr., CH 104. Fundamentals of organic chemistry. Designed for students in Human Sciences and others.
204. **ANALYTICAL CHEMISTRY (3).** LEC. 3. EACH QUARTER. Pr., CH 105 and 105L or 113. Theory and application of gravimetric, volumetric, and colorimetric chemical analysis.
- 204L. **ANALYTICAL CHEMISTRY LABORATORY (2).** LAB. 8. EACH QUARTER. Pr., or Coreq., CH 204. Analytical techniques applied to the analysis of ores and minerals.
205. **ANALYTICAL CHEMISTRY (5).** LEC. 3, LAB. 6. Pr., CH 113 or 204. Fundamental concepts used in analytical chemistry and observed in the laboratory via gravimetric analysis and separation techniques.
207. **ORGANIC CHEMISTRY (4).** LEC. 4. Pr., CH 104. This course together with CH 208 meets the needs of students in Laboratory Technology, Pre-Medicine, Pre-Dentistry, Pre-Veterinary Medicine, Pre-Pharmacy, and in other biological sciences.
- 207L. **ORGANIC CHEMISTRY LABORATORY (1).** LAB. 3. Pr., or Coreq., CH 207.
208. **ORGANIC CHEMISTRY (3).** LEC. 3. Pr., CH 207 and 207L. Continuation of CH 207.
- 208L. **ORGANIC CHEMISTRY LABORATORY (2).** LAB. 6. Pr., or Coreq., CH 208.
209. **ORGANIC CHEMISTRY (5).** LEC. 5. Pr., CH 208. A continuation of CH 208 with emphasis on those organic compounds considered to be the most important to the understanding of biochemistry; i.e., polyfunctional compounds, carbohydrates, liquids, amino acids, proteins, and heterocyclic compounds.
- 209L. **ORGANIC CHEMISTRY LABORATORY (2).** LAB. 6. Pr., CH 208L.
301. **BIOCHEMISTRY (5).** Pr., CH 208. Especially designed for students in Pharmacy. Credit in CH 518 precludes credit for this course.
302. **BIOCHEMISTRY (5).** Pr., CH 301. Continuation of CH 301. Credit in CH 519 precludes credit for this course.
316. **PHYSICAL CHEMISTRY (5).** Pr., MH 140 or 160. CH 105 and PS 205. A one-quarter course for pre-medicine students.
470. **HONORS THESIS (3-6).** Pr., Enrollment in the University Honors Program. May be repeated once for a maximum of 6 hours credit.
490. **SPECIAL PROBLEMS IN CHEMISTRY (5).** LAB. 15. Pr., COL. senior standing. Not open to graduate students. An individual problem course. Each student will work under the direction of a staff member on some problem of mutual interest. May be repeated for a maximum of 15 credit hours.

ADVANCED UNDERGRADUATE AND GRADUATE

504. **INTRODUCTION TO MOLECULAR ORBITAL METHODS (5).** Pr., CH 209 and 508 or equivalent. Elementary quantum mechanics, Huckel molecular orbital theory, SCF molecular orbital procedures, orbital symmetry problems, and applications of the various theoretical procedures to organic chemistry.

507. **PHYSICAL-CHEMISTRY (5). LEC. 4, LAB. 3.** Pr., CH 104 or 112; MH 264; PS 221 or 206. A discussion of the more important theories and laws of physical chemistry.
508. **PHYSICAL CHEMISTRY (5). LEC. 4, LAB. 3.** Pr., CH 507. Continuation of CH 507.
509. **PHYSICAL CHEMISTRY (5). LEC. 4, LAB. 3.** Pr., CH 508. An extension of principles in CH 507-508 with special reference to modern theories of the structure of matter.
510. **INTERMEDIATE INORGANIC CHEMISTRY I (5). LEC. 5.** Pr., CH 508. Atomic structures, valence bonding, and periodic properties of the elements.
511. **INTERMEDIATE INORGANIC CHEMISTRY II (5). LEC. 3, LAB. 6.** Pr., CH 510. Synthesis and purification of typical inorganic compounds.
512. **CHEMICAL THERMODYNAMICS (5).** Pr., CH 508. Basic laws governing changes in energy in gases, liquids, and solids.
513. **ANALYTICAL CHEMISTRY (5). LEC. 3, LAB. 6.** Pr., CH 507. Fundamental concepts used in instrumental analytical chemistry and as observed in the laboratory via spectrophotometric, electroanalytical, and chromatographic techniques.
518. **BIOCHEMISTRY (4).** Pr., CH 204, 204L, 208. Classification, structure, and reactions of the major chemical constituents of living matter. (Same course as ADS 518.)
- 518L. **BIOCHEMISTRY LABORATORY (1). LAB. (3).** Coreq., CH 518. Identification and quantitation of compounds from the important biochemical classes. Examples include amino acid chromatography, dipeptide sequencing, glucose concentration, etc. (Same course as ADS 518L.)
519. **BIOCHEMISTRY (4).** Pr., CH 518, ADS 518 or its equivalent. Intermediary metabolism. Carbohydrate, lipid, oxidation, amino acids and nucleotide pathways will be covered. Genetics and protein biosynthesis will be studied also. (Same course as ADS 519.)
- 519L. **BIOCHEMISTRY LABORATORY (1). LAB. (3).** Coreq., CH 519. Partial purification, kinetic studies and characterization of enzymes and nucleotides from various plants, animals, and bacteria. (Same course as ADS 519L.)
520. **CLINICAL BIOCHEMISTRY (5). LEC. 3, LAB. 6.** Pr., CH 302 or CH 519 or its equivalent. Principles of clinical chemical analysis.
530. **ADVANCED GENERAL CHEMISTRY (5). LEC. 4, LAB. 3.** Pr., CH 207 or COI, junior standing. An indepth study of chemistry topics that are traditionally included in high school chemistry. Not available for credit to students in the areas of Science, Mathematics, or Engineering.

GRADUATE

610. **ADVANCED INORGANIC CHEMISTRY (5).** Pr., CH 510 or equivalent. Selected groups of inorganic compounds are considered from a modern physicochemical viewpoint; thus emphasizing their chemical and physical properties, their rates of conversion one into another, their molecular structure, and valence relationships.
611. **PHYSICAL METHODS IN INORGANIC CHEMISTRY (5).** Pr., CH 610 or equivalent. The theory and applications of modern techniques for structural and bonding information in inorganic chemistry. NMR, IR, Raman, NQR, mass spectroscopy, electronic spectra, ESR, and other techniques will be discussed.
612. **ORGANO-METALLIC CHEMISTRY (5).** Pr., CH 610 or equivalent. General organo-metallic chemistry with an emphasis on recent developments.
614. **THE CHEMISTRY OF COORDINATION COMPOUNDS (5).** Pr., CH 510 or equivalent. Complex inorganic compounds with emphasis on early and modern developments, isomerism, chelation, and methods of determining formation constants.
616. **ADVANCED TOPICS IN INORGANIC CHEMISTRY (5).** Pr., CH 610 or equivalent. Includes the most active research areas of modern inorganic chemistry.
620. **ADVANCED ORGANIC CHEMISTRY I (5). LEC. 5.** Pr., CH 209 or equivalent. Organic reaction mechanisms, free radicals, carbonium ions, carbanions, carbenes, etc.
621. **ADVANCED ORGANIC CHEMISTRY II (5). LEC. 5.** Pr., CH 620. Physical organic chemistry with emphasis on the interpretation of organic reaction mechanisms.
622. **ADVANCED ORGANIC CHEMISTRY III (5). LEC. 5.** Pr., CH 620. Current synthetic methods of organic chemistry.
623. **HETEROCYCLIC COMPOUNDS (5).** Pr., CH 621 or equivalent. Organic compounds containing heterocyclic ring systems.
624. **ELEMENT-ORGANIC COMPOUNDS (5).** Pr., CH 621 or equivalent. Organic chemistry of Groups III, IV and V elements.
625. **ORGANIC NITROGEN COMPOUNDS (5).** Pr., CH 621 or equivalent. Organic compounds containing nitrogen.
627. **SPECIAL TOPICS IN ORGANIC CHEMISTRY (5).** Pr., CH 621 or equivalent. A selection of modern topics in organic chemistry.
628. **INTRODUCTION TO THEORETICAL ORGANIC CHEMISTRY (5).** Pr., CH 621 or equivalent. Topics generally considered include molecular structure; chemical reactions and energy change; structure-reactivity relationships; dipole moments and carbonium, olefinic and free-radical stability; and organic chemical spectroscopy.
- 630-631. **ADVANCED PHYSICAL CHEMISTRY (5-5).** Pr., CH 509. CH 630 is pr. for CH 631. Topics generally considered include kinetic theory of matter, modern theories of the structure of matter, generalized thermodynamics, relation of molecular structure to spectroscopic and thermodynamic properties, and kinetics of chemical reactions.

632. **RELATION BETWEEN STRUCTURE AND PROPERTIES OF CHEMICAL SUBSTANCES (5).** Pr., CH 630. Established relationships that exist between structures of organic and inorganic compounds and physical properties which are relatively easy to determine. The principal aim is the demonstration of the fundamental relation of structure compounds and electronic configurations.
633. **CHEMICAL KINETICS (5).** Pr., CH 509. The mathematics and characterization of chemically reacting systems includes discussions of the collision theory, the transition state theory, unimolecular reactions in condensed phases, behavior of nonstationary-state systems, and photochemistry.
634. **HETEROGENEOUS EQUILIBRIA (5).** Pr., CH 630. Chemical and physical equilibria in heterogeneous systems.
636. **STATISTICAL THERMODYNAMICS (5).** Pr., CH 630. Statistical approach to thermodynamics and chemical equilibrium.
637. **INTRODUCTION TO QUANTUM CHEMISTRY (5).** Pr., CH 630. Quantum theory as applied to chemical problems.
638. **MOLECULAR SPECTROSCOPY (5).** Pr., CH 630. Theory and application of optical and magnetic resonance spectroscopy.
640. **CARBOHYDRATES (5).** Pr., CH 518 or equivalent. The chemistry of the mono- and polysaccharides.
641. **PROTEINS (5).** Pr., CH 507 and CH 519 or equivalent. Chemical and physical properties of amino acids and proteins, protein structure and the relation of protein structure to function.
642. **LIPIDS (5).** Pr., CH 519 or equivalent. Chemistry of the lipids and their biological significance.
643. **ENZYMES (5).** Pr., CH 519 or equivalent. The principles of enzyme chemistry including the physical, chemical and catalytic properties of enzymes.
644. **TOPICS IN BIOCHEMISTRY (1-10).** Pr., CH 519 or equivalent and COI. Advanced selected areas of metabolism and the techniques for characterization of macromolecules.
645. **BIOCHEMICAL RESEARCH TECHNIQUES (5).** Pr., CH 519 or equivalent. Modern biochemical laboratory techniques.
646. **PHYSICAL BIOCHEMISTRY (5).** Pr., CH 209 and CH 509 or equivalent. The structure and properties of biological compounds (saccharides, lipids, amino acids, proteins, nucleic acids, and enzymes). The bioenergetics of the important metabolic pathways are investigated. Emphasis on structure of biological compounds and mechanisms of biological reactions.
650. **ANALYTICAL CHEMISTRY (5).** Pr., CH 513 or equivalent. Analytical principles, applications and methods, mathematical interpretations, and current developments.
651. **ANALYTICAL CHEMISTRY (5).** LEC. 4, LAB. 3. Pr., CH 513. Analytical application of chemical spectroscopy.
652. **THEORIES AND CURRENT TOPICS OF ANALYTICAL CHEMISTRY (5).** Pr., CH 651. Winter, odd years.
653. **PHYSIO-CHEMICAL SEPARATIONS (5).** LEC. 4, LAB. 3. Pr., CH 509. Spring, even years.
654. **RADIOCHEMICAL ANALYSIS (5).** LEC. 3, LAB. 6. Pr., CH 205. Summer, odd years. The application of radioactive tracers and related techniques to chemical analysis.
655. **CHEMICAL INSTRUMENTATION (5).** LEC. 5. Pr., CH 513. Chemical transducers and conversion of the transducer output to some usable form.
670. **SEMINAR (1).** Each quarter except Summer. Required course for all graduate students in chemistry. May be repeated for a maximum of 10 credit hours.
691. **DIRECTED INDIVIDUAL STUDY IN CONTEMPORARY CHEMISTRY (CREDIT TO BE ARRANGED.)** Pr., completion of 30 hours of graduate courses in chemistry. May be repeated for credit.

Civil Engineering (CE)

Professors Ramey, Head, Bell, Benefield (Alumni), Guven, Molz (Feagin),
 Roberts, Swinson, and Yoo (Gottlieb)
 Associate Professors Jenkins, Melville, Morgan, Parker, Tedesco, and Vecellio
 Assistant Professors D. Brown, R. Brown, Elton, Shoemaker,
 Springfield, and Stallings

General Curriculum (GC) students (those with undeclared majors) may enroll only with departmental consent.

200. **CE SEMINAR (1).** Pr., sophomore standing in CE or COI. Civil engineering perspectives and work, curriculum, and student activities and opportunities. Discussion of construction, environmental, geotechnical, hydraulic, structures, and transportation engineering and undergraduate and graduate speciality areas in CE at Auburn.
201. **SURVEYING (5).** LEC. 4, LAB. 3. Coreq., CE 202. Data collection and analysis emphasized. Analysis of errors, distance and angle measurements; leveling; traversing; simple curves; topographic mapping and construction surveying.
202. **INTRODUCTION TO COMPUTER METHODS IN CIVIL ENGINEERING (5).** LEC. 4, LAB. 2. Pr., MH 163. Introduction to computer programming using BASIC and FORTRAN languages; computer solutions of civil engineering problems; library programs.
301. **CIVIL ENGINEERING ANALYSIS (3).** Pr., MH 265, CE 202. Applications of calculus and ordinary differential equations, numerical methods, vector algebra and linear algebraic equations to Civil Engineering problems.
303. **CIVIL ENGINEERING STATISTICS (4).** Pr., MH 264, CE202. Probability concepts, distributions, estimation, hypothesis testing, regression, correlation analysis, emphasis on civil engineering applications.

310. **HYDRAULICS I (3).** Coreq., CE 301, ME 301, 321. Fundamental concepts of fluid mechanics, hydrostatics, kinematics, ideal flow, viscous effects, transport phenomena, drag, laminar and turbulent flow in pipes and channels.
311. **HYDRAULICS II (3).** Pr., CE 310. Applications of fluid mechanics, pipe flow, fluid measurements, pipe networks, pumps, open channel, dimensional analysis and theory of modeling.
- 311L. **HYDRAULICS LABORATORY (1).** Coreq., CE 311. Laboratory experiments and demonstrations, pipe flow, pumps, open channels, gates, weirs, analysis and presentation of hydraulic data.
312. **HYDROLOGY (3).** Pr., CE 311, CE 303. Hydrologic cycle, precipitation, infiltration, runoff, unit hydrograph, rational method, evaporation, flood routing, ground water, frequency analysis, synthetic data generation.
321. **WATER AND WASTEWATER COLLECTION SYSTEMS (3).** Pr., CE 310. Theory and design of water collection and distribution facilities and waste collection systems.
350. **HIGHWAY ENGINEERING I (3).** Pr., CE 201, junior standing. Introduction to highway engineering practice with emphasis on facility design and operation. Topics include highway system characteristics; transportation planning; traffic operations and control; driver, vehicle, and roadway characteristics; geometric designs; and highway safety.
360. **THEORY OF STRUCTURES I (5).** LEC. 4, LAB. 3. Pr., EGR 207. Coreq. CE 301. Basic structural analysis of determinate structures, deflection curves, influence lines and their application on determinate structures, column buckling. Laboratory sessions on the properties of structural materials and fundamental behavior of solids.
362. **THEORY OF STRUCTURES II (3).** Pr., CE 360. Structural analysis of indeterminate structures using geometric and energy methods. Influence lines for indeterminate structures. Approximate methods.
364. **MATRIX METHODS OF STRUCTURAL ANALYSIS (3).** Pr., CE 362. Introduction to stiffness and flexibility methods. Computer implementation of stiffness method. Introduction to structural design utilizing matrix analysis methods.
400. **ADVANCED SURVEYING AND MAPPING (5).** LEC. 4, LAB. 3. Pr., junior standing. Programming principles and measuring are emphasized. Selected topics from map projections, electronic and special instruments; geodesy.
420. **WATER TREATMENT (4).** Coreq., CE 321. Theory, design, and operation of water treatment facilities.
421. **WASTEWATER TREATMENT (4).** LEC. 3, LAB. 3. Pr., CE 420. Theory, design, and operation of wastewater treatment facilities. Emphasis on biological treatment.
422. **ENVIRONMENTAL ENGINEERING DESIGN I (3).** Pr., CE 421. Process design of environmental engineering systems.
423. **ENVIRONMENTAL ENGINEERING DESIGN II (3).** Pr., CE 311, 421. Hydraulic design of environmental engineering systems.
428. **RADIOLOGICAL HEALTH ENGINEERING (3).** Pr., senior standing. Sources and properties of radiation, ionizing effects, biological effects, dosimetry, detection and measurement, design of radiation shielding, decontamination, disposal of wastes, legal aspects of radiation control, public attitudes.
430. **INTRODUCTION TO SOIL MECHANICS (5).** LEC. 4, LAB. 3. Pr., CE 301, GL 315. Physical properties of soils; subsurface investigations; clay mineralogy; soil classification; concept of effective stress; consolidation theory; time-settlement analyses; soil compaction; and shear strength.
431. **SOIL AND FOUNDATION ENGINEERING (3).** Pr., CE 430. Slope stability; vertical and lateral soil pressures; bearing capacity; foundations.
440. **CONTRACTS AND SPECIFICATIONS (3).** Coreq., CE 460, senior standing. Legal and technical principles of construction contract documents. Drawings, plans and specifications, contract law, professional liability and ethics.
450. **TRAFFIC ENGINEERING FUNDAMENTALS (3).** Pr., CE 350. The fundamental elements of traffic engineering including traffic studies, traffic operations, and traffic control devices.
452. **AIRPORT DESIGN (4).** Pr., CE 350 or COI. An analysis of the elements affecting the design of airports including runway configuration, capacity analyses, geometric design of runways and taxiways, pavement design and airfield drainage.
454. **HIGHWAY ENGINEERING II (3).** Pr., CE 350, IE 360. Planning and development of highway projects; preparation of project plans; earthwork; pavement and drainage design; construction and maintenance practices.
460. **REINFORCED CONCRETE DESIGN I (3).** Coreq., CE 362. Concrete properties. Design synthesis and analysis of reinforced concrete beams, slabs, and columns. Reinforcement detail.
465. **STEEL DESIGN I (3).** Coreq., CE 362. Steel properties. Design synthesis and analysis of steel members in tension, compression, shear and flexure. Structural fasteners.
479. **HONORS THESIS (3-6).** Pr., COI and department head approval. Individual student endeavor consisting of directed research and writing of honors thesis. (CE Honors Program students only. May be repeated once for a maximum of 6 total credit hours.)
482. **CIVIL ENGINEERING MATERIALS (4).** LEC. 3, LAB. 2. Pr., CE 430 or concurrently. Introduction to common civil engineering materials used in construction of civil facilities including building, highways, etc. Materials to be included are concrete, wood, asphalt, steel, and aggregates.
490. **SPECIAL PROBLEMS. (CREDIT 1-5).** Pr., COI and department head approval. Individual student endeavor under staff supervision involving special problems of an advanced nature in civil engineering.

ADVANCED UNDERGRADUATE AND GRADUATE

511. **OPEN CHANNEL DESIGN (3).** Pr., CE 311. Fundamental concepts, uniform flow, rapidly varied flow, gradually varied flow, subcritical and supercritical flow, water surface profiles, energy dissipation, introduction to transient phenomena.
513. **COASTAL ENGINEERING. (3).** Pr., CE 311. Basic wave theory, diffraction, reflection, refraction, wind waves generation, wave effects on structures and sediments.

515. **SUBSURFACE HYDROLOGY (3).** Pr., CE 311. Soil moisture and groundwater, geology of groundwater, principles of groundwater flow, regional flow systems, flow to wells.
517. **WATER RESOURCES ENGINEERING (3).** Pr., CE 311, 312. Uses and sources of water; economic, hydrologic, hydraulic, environmental and legal aspects of design and operation of water-resource systems; multi-purpose projects; irrigation, hydroelectric power generation and flood control.
518. **STORMWATER DRAINAGE DESIGN (3).** Pr., CE 312. Urban, highway, and airfield storm runoff estimation. Flood plain prediction and management. Hydraulic design of stormwater drainage systems, inlets, storm sewers, open channels, culverts, detention basins.
520. **ENVIRONMENTAL ENGINEERING CHEMISTRY I (3).** Pr., COI and CE 420. Equilibrium chemistry aspects of environmental engineering.
- 520L. **ENVIRONMENTAL ENGINEERING CHEMISTRY I LABORATORY (1).** Pr., COI. Coreq., CE 520. Laboratory testing procedures and experiments relating to the treatment of waters and wastes.
521. **ENVIRONMENTAL ENGINEERING CHEMISTRY II (3).** LEC. 2, LAB. 3. Pr., CE 520. Numerical and graphical techniques associated with physical, chemical, and biological aspects of environmental engineering; laboratory testing procedures as well as computer applications of test results.
523. **ENVIRONMENTAL HEALTH ENGINEERING (3).** Pr., CE 420 or 421. Application of engineering methodology to communicable disease control, insect and rodent control, milk and food sanitation, noise control, industrial hygiene, refuse collection, and hazardous waste management.
524. **AIR POLLUTION (5).** Pr., COI, senior standing. The nature, sources and effects of polluting materials including gases, dusts, vapors and fumes and the relations of atmospheric conditions to their dispersal. Introduction to theory and design of air pollution control devices and sampling programs. Legal aspects of air pollution.
527. **FUNDAMENTALS OF WATER SUPPLY AND WASTE TREATMENT (5).** Pr., COI, senior standing. (Not for credit for civil engineering students.) The principles of water supply and waste disposal and the chemistry and biology of water and waste treatment will be presented. Alternatives in water supply and waste disposal will be considered and the theory of treatment operations will be discussed. Laboratory exercises will be conducted.
528. **FUNDAMENTALS OF ADVANCED WATER AND WASTEWATER TREATMENT (3).** Pr., CE 420, CE 421. (Not for graduate credit for civil engineering students.) The principles of various methodologies for advanced water and wastewater treatment will be discussed. Economic trade-offs and process selection will be emphasized.
530. **SHALLOW FOUNDATION DESIGN (3).** Pr., CE 431. Design of spread footings, combined footings, mat foundations, rigid and flexible retaining walls.
531. **DEEP FOUNDATION DESIGN (3).** Pr., CE 431. Single piles, vertical and lateral loads, pile installation, pile groups, field load tests, drilled shafts, and caissons. Design and construction methods.
532. **EARTH RETAINING STRUCTURES (3).** Pr., CE 431 or equivalent. Gravity and cantilever retaining walls, reinforced earth walls, anchored bulkheads, cofferdams, and braced excavations. Analysis and design.
536. **PAVEMENT MATERIAL CHARACTERIZATION (3).** LEC. 2, LAB. 3. Pr., 431. Properties of subgrade soils, granular bases, stabilized soils and bases, bituminous concrete, and portland cement concrete; laboratory testing techniques.
538. **EARTH DAM ENGINEERING (3).** Pr., CE 431. Earth dam design and construction. Material selection, filter design. Flowlines in earth dams. Stability analysis of earth dams.
542. **CONSTRUCTION MANAGEMENT (3).** Pr., senior standing. Project planning and scheduling, estimating and bidding, labor law, labor productivity, project safety.
544. **CONSTRUCTION EQUIPMENT AND METHODS (3).** Pr., senior standing. Selection of equipment for heavy construction operations; Production rates, owning and operating costs, optimizing equipment mix. Construction methods; formwork, compressed air and dewatering systems, blasting.
550. **TRAFFIC ENGINEERING ANALYSIS (3).** Pr., CE 350, 303. The theory and practice of traffic engineering including evaluation studies and capacity analyses.
551. **TRAFFIC CONTROL SYSTEMS DESIGN (4).** Pr., CE 350. Fundamental design concepts for highway traffic control systems. Topics include control requirements and warrants; hardware operation and equipment selection; development and implementation of timing plans for isolated intersections and intersection networks.
553. **GEOMETRIC DESIGN (4).** Pr., CE 350. An analysis of the elements affecting the location and design of rural highways, urban highways and arterial streets including design controls and criteria, cross-section elements, intersection design, interchange design, and social and environmental considerations.
554. **FREEWAY PLANNING AND OPERATIONS (3).** Pr., CE 350. Planning, design and operation of urban freeways and expressways, and rural interstate facilities. Topics include project planning and development; design concepts and criteria; interchange and ramp design; capacity analysis; freeway operations; surveillance and control systems.
556. **TRANSPORTATION PLANNING (3).** Pr., CE 350 or COI. The planning process for urban and regional transportation development. Topics include planning objectives and data requirements; planning inventories; modeling of trip-making behavior; development and evaluation of alternative plans; transportation system management concepts.
558. **RAILWAY ENGINEERING (3).** Pr., CE 350. Fundamental elements affecting the planning, design and operations of rail systems.
560. **REINFORCED CONCRETE DESIGN II (3).** Pr., CE 460. Building assemblages, USD for beams; T-beams; doubly reinforced beams; long columns and beam-columns; one way and two way slabs; footings; retaining walls. Interpretation of codes. Serviceability check.
562. **PRESTRESSED CONCRETE DESIGN (3).** Pr., CE 460. Properties and behavior of prestressed concrete. Prestressing systems and end anchorages. Loss of prestress. Analysis and design of beams for flexure. Camber, deflection, and cable layout.

565. **STEEL DESIGN II (3).** Pr., CE 465. Structural assemblages. Interpretation of codes; analytical verification of lateral frames.
567. **COMPUTER METHODS IN STRUCTURAL ENGINEERING (3).** Pr., CE 364. Principles of matrix formulations of structural problems; force and displacement methods. Algorithms for computer programs for analysis of trusses, beams, and frames. Use of computer programs, p columns, floor and wall assembly, and wood formwork. Timber trusses and laminated arches.
570. **WIND ENGINEERING (3).** Pr., CE 362; CE 460; or CE 465. Wind phenomena and wind pressures on structures; effects of wind on structures and damage mechanism; building codes, standards, and procedures pertaining to wind engineering; design of wind resistant structures.
582. **OPTIMIZATION METHODS (3).** Pr., CE 301. Applications of calculus, linear programming and dynamic programming to civil engineering systems.
583. **SIMULATION METHODS (3).** Pr., CE 303. Monte Carlo methods; continuous variable simulations, applications of discrete variable simulation languages to civil engineering systems.
584. **SOIL STABILIZATION (3).** Pr., CE 430, or equivalent; junior standing. Methods of stabilizing soft soil; consolidation, compaction with the use of lime, cement and other additives, construction operations, costs, and field control related to soil stabilization.
585. **ASPHALT TECHNOLOGY (3). LEC. 2, LAB. 3.** Pr., CE 482. Production and uses of asphalt; measurement and significance of laboratory properties of asphalt, including viscosity, penetration, flashpoint, ductility, solubility, thin film oven test, and specific gravity; measurement of asphalt mix properties, including Marshall Stability and maximum specific gravity.
587. **PAVEMENT DESIGN (4). LEC. 3, LAB. 3.** Pr., CE 350, CE 431. Material characterization, pavement response models, pavement performance models, structural design systems.
589. **PAVEMENT CONSTRUCTION (3).** Pr., CE 482. Methods, equipment, and quality control for pavement materials production and placement; materials include soils, granular layers, asphalt concrete, surface treatment and Portland Cement Concrete; description of plans and specifications for each material.
590. **SPECIAL PROBLEMS (CREDIT 1-5).** Pr., COI and department head approval; may be taken more than one quarter. Staff supervision of advanced, individual student investigations of specialized problems in civil engineering.

GRADUATE

611. **NUMERICAL METHODS IN HYDRAULICS AND HYDROLOGY (3).** Pr., CE 311, MH 362, MH 560, or COI. Derivation of basic surface and subsurface flow equations, numerical modeling methods, selected problems.
612. **ADVANCED NUMERICAL METHODS IN SUBSURFACE HYDROLOGY (3).** Pr., CE 612 or equivalent. Solution of complex partial differential equations in subsurface hydrology using the finite-difference method. Applications include solutions to non-linear equations and to coupled systems of linear and non-linear equations.
614. **ENVIRONMENTAL DISPERSION PROCESSES (3).** Pr., CE 511, MH 362, or COI. Introduction to theories of turbulent diffusion in the atmospheric and water environment; analytical, numerical and empirical solutions of selected problems in air and surface-water pollution; applications to design of stacks, ocean outfalls, and diffusers.
615. **GROUNDWATER HYDRAULICS (3).** Pr., CE 515 or COI. Fluid flow in porous media, potential flow theory, confined and unconfined flow, well flow, dispersion, hydrothermal problems, modeling.
616. **HYDRAULIC ANALYSIS OF UNSTEADY FLOW (3).** Pr., CE 511, MH 362, or COI. Introduction to transient problems, pipeline transients, open channel transients, analytical and numerical modeling.
617. **WATER RESOURCES SYSTEMS ENGINEERING I (3).** Pr., CE 583 or COI. Applications of systems methodology to hydrology, reservoir operation, flood forecasting, flood routing.
618. **WATER RESOURCES SYSTEMS ENGINEERING II (3).** Pr., CE 617. Simulation, linear, and dynamic programming applied to pipe and open/channel networks in water supply and water treatment systems.
619. **WATER RESOURCES SYSTEMS ENGINEERING III (3).** Pr., CE 618. Water quality forecasting and multipurpose river basin development, study of current literature.
620. **UNIT OPERATIONS IN WATER AND WASTE TREATMENT (3).** Pr., COI. The theory of various unit operations is developed and the application of these operations to water and wastewater treatment is considered.
621. **UNIT PROCESSES IN WATER AND WASTE TREATMENT I (3).** Pr., COI. Alkalinity, acidity, corrosion, chemical precipitation and coagulation are discussed within the context of water and wastewater treatment process theory and design.
622. **BIOLOGICAL WASTE TREATMENT (5).** Pr., COI. Development and application of the theories of biological waste treatment.
623. **UNIT PROCESSES IN WATER AND WASTE TREATMENT II (3).** Pr., COI. Ion exchange, adsorption, disinfection and gas transfer are discussed.
624. **UNIT OPERATIONS IN WATER AND WASTE TREATMENT II (3).** Pr., COI. Sedimentation, flotation and centrifugation are discussed.
627. **ENVIRONMENTAL ENGINEERING CHEMISTRY III (3). LEC. 2, LAB. 3.** The chemistry of natural systems including: equilibrium chemistry, buffer systems in natural water, thermodynamics, and surface chemistry.
628. **STREAM SANITATION (5).** COI. Physical, chemical, biological and hydrological considerations relating to the degradation and self-purification of streams and estuaries. Water uses and water quality goals, objectives, and criteria. Principles of water quality modeling and waste-load allocation. Field studies will be performed.
629. **ADVANCED WASTE TREATMENT (3).** Pr., COI. Nitrogen and phosphorus removal techniques will be stressed. Other advanced waste treatment topics will be discussed.

631. **ADVANCED SOIL MECHANICS (5). LEC. 4, LAB. 3.** Pr., CE 431 or equivalent. Stress-strain characteristics of soils, stress distribution in soil media, consolidation, shear strength, and bearing capacity, with application to analysis and design of spread footings, rafts, and deep foundations; case studies.
633. **SEEPAGE, DRAINAGE, AND FLOW NETS (4).** Pr., CE 431 or equivalent. Darcy's Law, flow net construction, confined and unconfined flow systems, isotropic and anisotropic permeability, zoned embankments, soil filter design, drainage systems.
634. **SOIL STABILITY PROBLEMS (3).** Pr., CE 431 or equivalent. Retaining structures including cofferdams, bulkheads, and retaining walls; stability of natural and cut slopes, embankments, earth dam design; methods of field measurements; case studies.
635. **SOIL DYNAMICS (4).** Pr., CE 431 or equivalent, CE 667 or equivalent. Wave propagations in soils, lumped systems as applied to soil-structure systems, soil properties for dynamic loading conditions; earthquakes, oscillations, and blast loading conditions; analysis and design.
636. **IN SITU TESTING OF SOILS (3).** Pr., CE 431. Standard penetration tests, cone penetration tests, pressuremeter and vane testing. Procedures and interpretation of results.
640. **CONSTRUCTION CONTRACTS (3).** Pr., CE 540. Format and content of construction contracts and specifications; legal principles of construction law; review of case histories and court decisions.
641. **CONSTRUCTION PLANNING AND CONTROL (3).** Pr., CE 542. Advanced concepts of planning, scheduling, and resource leveling; project cost accounting; labor productivity and motivation; project management computer systems.
642. **ESTIMATING AND BIDDING (3).** Pr., CE 542. Preliminary and definitive estimates; cash flow analysis; unbalanced bids, bidding strategies; bidding models.
643. **CONSTRUCTION MATERIALS AND FORMING METHODS (3).** Construction materials management systems; construction material properties, specifications and testing; earthwork and compaction; material handling and transportation; formwork design and erection.
644. **ADVANCED CONSTRUCTION EQUIPMENT AND METHODS (3).** Engineering principles of equipment selection and performance for heavy construction; pile driving; tunneling and blasting; paving; equipment inventory and replacement models.
645. **CONSTRUCTION APPLICATIONS OF OPERATIONS RESEARCH (3).** Pr., CE 582. Applications of linear programming, dynamic programming and simulation to construction operations and policy decisions.
650. **TRAFFIC FLOW THEORY (3).** Pr., CE 550 or COI. A study of the basic phenomena underlying traffic stream movement and individual vehicle behavior. Topics include flow parameters and relationships; microscopic and macroscopic flow models; equations of motion and state; continuity; single and multi-regime flow models.
651. **TRANSPORTATION SYSTEM ANALYSIS (3).** Pr., COI. Advanced operations research methods applied to transportation problems including regression/correlation analysis, queueing theory, simulation, and stochastic processes.
652. **MASS TRANSPORTATION SYSTEMS (3).** Pr., CE 556 or equivalent. Mass transportation technology and characteristics; planning for mass transit; travel demand models; innovative technologies.
653. **AIR TRANSPORTATION MODELING AND OPERATIONS (3).** Pr., CE 452, 651. The development and analysis of air transportation models for airport demand, forecasting and operations.
654. **TRANSPORTATION SAFETY (3).** Pr., CE 550 or COI. A study of transportation safety problems and the engineer's role in developing and administering safety programs. Topics include accident investigation and reconstruction; analysis of accident data; development and evaluation of accident countermeasures and safety programs.
656. **COMPUTER METHODS FOR TRANSPORTATION PLANNING (3).** Pr., CE 556. The structure and operation of computer algorithms applicable to urban transportation planning. Course emphasis on software for modeling trip-making behavior and database management.
657. **TRANSPORTATION PLANNING MODELS (3).** Pr., CE 556. An extension of the basic transportation planning process to include the theory of travel demand modeling and contemporary developments in the field. Course topics will include both aggregate and disaggregate behavioral models.
659. **SPECIAL TOPICS IN TRANSPORTATION ENGINEERING.** Credit to be arranged. May be taken more than one quarter.
660. **ADVANCED STRESS ANALYSIS (3).** Response of structures to complex loadings and support conditions. Shear center, unsymmetrical bending, curved beams. Beams on elastic foundation. Torsion in structures.
661. **SPECIAL TOPICS IN STRUCTURAL DESIGN (3-5).** Topics and credit hours may vary; special topics for advanced study will be selected.
662. **EXPERIMENTAL TECHNIQUES IN STRUCTURAL ANALYSIS (3). LEC. 2, LAB. 3.** Basis stress-strain relationships. Techniques and instrumentation for structural testing. Mechanical and electrical strain gages. Brittle lacquer, photogrid and photoelastic methods.
663. **NUMERICAL TECHNIQUES IN STRUCTURAL ANALYSIS (3).** Numerical methods (finite differences, Runge-Kutta, etc.) of analysis for structural members with variable sections; stability, vibrations, eigenvalue and beam-column problems. Applications.
664. **STABILITY OF STRUCTURES I (3).** Stability theory and geometric instability of structures, elastic buckling of bars and frames. Beam-columns. Inelastic buckling.
665. **ADVANCED MATRIX ANALYSIS OF SKELETAL STRUCTURES (3).** Pr., CE 567 or COI. Analysis of 2D and 3D framed structures. Special topics include temperature variation, eigensolution and minimal potential energy formulations.

666. **FINITE ELEMENT METHODS IN STRUCTURAL MECHANICS I (3).** Pr., 567 or COI. Principles of finite element analysis. Variational principles. Displacement polynomial and shape function formulations. 1-D and 2-D elements. Computer program development and applications.
667. **STRUCTURAL DYNAMICS I (3).** Free and forced vibration of single degree of freedom systems. Identification of dynamic loads. Response spectra.
668. **FATIGUE AND FRACTURE MECHANICS ANALYSIS (3).** Pr., CE 660 or 671. Types of fracture. Fundamentals of linear elastic fracture mechanics analysis and design. Yield theories. Fatigue design methods. Fatigue-fracture analysis methods.
669. **ANALYSIS OF STRUCTURAL PLATE SYSTEMS (3).** Analysis of isotropic and anisotropic plates with various shapes and boundary conditions due to lateral and inplane loads. Large deflection considerations in design. Numerical techniques.
670. **ANALYSIS OF SHELL SYSTEMS (3).** Pr., CE 669. Analysis of isotropic shell systems. Shells of revolution, cylindrical shells. Membrane and bending theories of analysis.
671. **APPLIED ELASTICITY (3).** Analysis of stress and strain. Generalized stress-strain relationships. Application to plane stress and plane strain.
672. **PLASTIC BEHAVIOR OF STRUCTURES (3).** Basic theory of plasticity. Plastic design procedures and code provisions in structural design.
673. **STABILITY OF STRUCTURES II (3).** Pr., CE 664. Torsional buckling and lateral-torsional buckling of beams. Buckling of plates and shells. Buckling of rings and arches.
674. **ADVANCED THEORY OF STRUCTURES (3).** Minimum energy principles. Space frame roofs and stagger truss building framing. Flexural members with varying moments of inertia. Arches and cables. Special topics.
675. **FINITE ELEMENT METHODS IN STRUCTURAL MECHANICS II (3).** Pr., CE 666. Mixed and hybrid variational principles for finite element methods. Fundamentals of nonlinear solid mechanics. Total and updated Lagrangian incremental finite element methods for finite deformations and/or nonlinear material behavior.
676. **STRUCTURAL DYNAMICS II (3).** Pr., CE 667. Multiple degree of freedom systems. Analysis of structures subject to blast loadings. Earthquake analysis. Responses of large structures to dynamic loads. Continuous systems.
677. **VARIATIONAL METHODS IN STRUCTURAL MECHANICS (3).** Pr., COI. Introduction to the calculus of variations. Formulation of various energy functionals. Derivation of Euler's equations and boundary conditions. Application of various energy principles to beams, plates, shells, elasticity, thermoelasticity, and plasticity problems. Introduction to the variational approaches to finite element methods.
678. **EARTHQUAKE ENGINEERING (3).** Pr., CE 667. Characteristics of earthquakes; seismicity; design earthquake motion; behavior of materials and structural components under earthquake loading; elastic and inelastic response spectra; soil-structure interaction; earthquake resistant design of structures.
679. **ADVANCED REINFORCED CONCRETE MEMBERS (3).** Pr., CE 460. Behavior of reinforced concrete members. Critical review of specifications, beams, slabs, columns, limit states.
680. **ADVANCED REINFORCED CONCRETE STRUCTURES (3).** Pr., CE 460. Behavior of reinforced concrete structures with emphasis on ductility and detailing of frame, floor, slab and braced shear wall structures. Detailing for seismic loads.
682. **PAVEMENT MATERIALS CHARACTERIZATION (4).** LEC. 3, LAB. 3. Pr., CE 585, CE 587. Laboratory and field test methods determining engineering properties of pavement materials including hot mix asphalt, Portland cement concrete, granular materials and subgrade soils; interpretation of test data for selecting property values; and use of engineering properties in design and analysis of pavement response to environmental and vehicular loads.
684. **PAVEMENT MANAGEMENT SYSTEMS (3).** Pr., CE 587 or equivalent. Concepts of pavement management, evaluation of pavement performance, serviceability concepts, structural evaluation, safety, maintenance and rehabilitation, economic considerations, selection of alternatives and life cycle analysis.
686. **ADVANCED STRUCTURAL PAVEMENT DESIGN (3).** Pr., CE 587, 682 or equivalent. Material fatigue and permanent deformation characteristics; layered elastic response models, finite element response models, viscoelastic response models and rational airport and highway pavement design systems.
688. **ASPHALT CONCRETE MIX DESIGN (4)** LEC. 3, LAB. 3. Pr., CE 585. Properties of asphalt aggregate and aggregate-asphalt mixtures; Marshall mix design procedures; Hveem mix design procedures.
690. **SEMINAR (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
691. **DIRECTED READING IN CIVIL ENGINEERING (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
698. **ENGINEERING PROJECT (CREDIT TO BE ARRANGED.)** Intended for students in the MCE program and may be taken more than one quarter. The project in civil engineering may be done on or off campus. Approval of the project and its final written report by the students' supervising professor and committee is required.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Communication Disorders (CD)

Professors Weidner, Head, Smith and Haynes
Associate Professors Pindzola and Moran
Assistant Professor Darling
Clinical Supervisors Boddie, Clark-Lewis, and Walker

SPEECH PATHOLOGY

- 340. **THE SPEECH AND HEARING MECHANISM (5).** Anatomy and physiology of the speech and hearing mechanism.
- 341. **PHONETICS (3). LEC. 2, LAB. 3.** Principles of phonetics and their application to speech.
- 350. **INTRODUCTION TO SPEECH PATHOLOGY — AUDIOLOGY (5).** Survey of the field of speech pathology-audiology. Includes history of the profession, the inter-relatedness of the various pathologies, general principles of evaluation and therapy, and the profession itself.
- 450. **PRINCIPLES OF SPEECH-LANGUAGE PATHOLOGY (5).** Not open to students emphasizing or majoring in speech-language pathology and audiology. Basic principles underlying a speech-language pathology program in a school setting. Description and discussion of disorders of oral communication, the identification of such disorders, principles of management, and the role of the classroom teacher.
- 455. **INTRODUCTION TO CLINICAL PROCEDURES IN SPEECH PATHOLOGY (4)**.** Orientation to clinical activities, management methods and preparation of professional reports. Clinical observation required.
- 456. **CLINICAL PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY (1).** Pr., CD 455 or equivalent*. May be repeated for a maximum of 2 hours toward minimum degree requirements.

ADVANCED UNDERGRADUATE

- 551. **ARTICULATION DISORDERS (5).** Pr., CD 340, 341, or equivalent**. Introduction to the principles of normal and deviant articulation acquisition.
- 552. **NORMAL AND DEVIANT LANGUAGE ACQUISITION IN CHILDREN (5).** Pr., CD 340, 341, or equivalent**. Introduction to the principles of normal and deviant language acquisition.
- 553. **FLUENCY DISORDERS (5).** Pr., CD 340, 341, or equivalent**. Introduction to the principles of fluent and disfluent verbal behavior.
- 554. **VOCAL DISORDERS (5).** Pr., CD 340, 341**. Introduction to the principles of normal and deviant vocal behavior.
- 555. **NORMAL ASPECTS OF HUMAN VERBAL COMMUNICATION (5).** Pr., CD 340, 341, junior standing**. Introduction to the normal processes of speech, language and hearing including: the physiological aspects of normal human speech communication, the hemispheric processing of language, the acoustical aspects of speech production and transmission, the psychoacoustic aspects of speech reception and the perceptual variables associated with linguistic behavior.
- 556. **COMMUNICATION DISORDERS IN THE AGING (4)**.** Not open to students majoring in speech-language pathology and audiology. Consideration of the normal communicative process and changes which may accompany the aging process. A basic study of the symptoms, causes, and treatment of hearing, speech and language disorders in the geriatric population.
- 557. **EVALUATION OF RESEARCH IN SPEECH PATHOLOGY AND AUDIOLOGY (5).** Pr., 551 or 552 or 553 or equivalent**. A critical survey of common experimental designs and statistical procedures used in the speech-language pathology/audiology literature. The course is designed for consumers of research as opposed to researchers.

GRADUATE

- 607. **INDEPENDENT STUDY (1-5).** Prior written approval required. Conferences, readings, research, and reports. May be repeated for a maximum of 5 hours credit.
- 650. **CLINICAL PROBLEMS IN SPEECH (2).** Pr., CD 455-456 series or COI. Methods, techniques, and clinical management of the disorders of speech. Clinical practice required. May be repeated for credit.
- 651. **ARTICULATION DISORDERS (4).** Pr., CD 551 or COI. Empirical and theoretical bases for articulatory pathologies, diagnoses, and therapies.
- 652. **ASSESSMENT STRATEGIES IN CHILD LANGUAGE DISORDERS (4).** Pr., CD 552 or COI. Empirical and theoretical bases for evaluation of language-disordered children.
- 653. **FLUENCY DISORDERS (4).** Pr., CD 553 or COI. Empirical and theoretical bases for disfluency disorders, diagnoses, and therapies.
- 654. **VOICE DISORDERS (4).** Pr., CD 554 or COI. Empirical and theoretical bases for voice pathologies, diagnoses and therapies.
- 655. **LANGUAGE AND SPEECH DISORDERS IN ADULTS (4).** Pr., CD 552 or COI. Empirical and theoretical bases for speech/language disorders associated with CNS pathologies, diagnoses, and therapies.
- 656. **CLEFT PALATE (4).** Pr., CD 551 or COI. Empirical and theoretical bases for speech/language pathologies associated with cleft palate, diagnoses, and therapies.
- 657. **SEMINAR IN SPEECH PATHOLOGY. (CREDIT TO BE ARRANGED.)** Pr., CD 551, 552, 553, 554, or COI. Advanced treatment of contemporary topics and trends, as well as current research aspects of speech pathology. May be repeated for credit with change in topics.

658. **FIELD EXPERIENCE IN SPEECH PATHOLOGY (5-10).** S-U grading only. Full-time assignment in a speech and hearing facility, the choice being made from the following settings: university speech and hearing clinic, hospital, public school, and various community agencies serving speech- and hearing-impaired children and adults. May be repeated for a maximum of 10 hours credit. No more than 5 hours may be used for minimum requirements toward a master's degree.
659. **THE NEUROLOGICAL BASES OF COMMUNICATIVE DISORDERS (4).** Pr., graduate standing. Anatomy and physiology of the central nervous system as it relates to speech, language and hearing functions and disorders.
680. **EXPERIMENTAL PHONETICS (4).** Pr., CD 341 or equivalent. Orientation to acoustic and physiologic instrumentation used in the study of normal and disordered speech.
681. **MOTOR SPEECH DISORDERS (4).** Pr., CD 559 or COI. Empirical and theoretical bases for motor speech disorders, diagnoses, and therapies.
682. **TREATMENT STRATEGIES IN CHILD LANGUAGE DISORDERS (4).** Pr., CD 552 or equivalent. In-depth analysis of management procedures in child language disorders.
699. **THESIS, (CREDIT TO BE ARRANGED.)**

*Effective Fall, 1990, GPA of 2.5 required to enter this course.

**Effective Fall, 1990, GPA of 2.2 required to enter this course.

AUDIOLOGY

465. **INTRODUCTION TO CLINICAL PROCEDURES IN AUDIOLOGY (3).** Pr., CD 560 or equivalent*. Audiological instrumentation and test procedures.
467. **ADVANCED AUDIOLOGICAL EVALUATION PROCEDURES (2).** Pr., CD 465 and 562 or equivalent*. Procedures in masking and special testing.
560. **INTRODUCTION TO AUDIOLOGY (5)**.** Principles of auditory reception, the hearing mechanism and the problems involved in measuring, evaluating, and conserving hearing.
561. **HEARING PATHOLOGY (5).** Pr., CD 560 or equivalent**. Evaluation and rehabilitation of aural handicapped children and adults; hearing aids and hearing training. Clinical practice.
562. **HEARING EVALUATION, REHABILITATION AND CONSERVATION (5).** Pr., CD 561 or COI**. Detailed concern for the rehabilitation problems of children and adults in the area of auditory training, speech reading and speech conservation. Clinical practice.
660. **CLINICAL PROBLEMS IN HEARING (2).** Pr., CD 465, 560, 561, and 562, or COI. May be repeated for credit.
661. **PEDIATRIC AUDIOLOGY (4).** Pr., CD 560, 561, 562, or COI. Etiologic factors, screening, audiologic assessment, differential diagnosis, and clinical management of infants and children with hearing disorders.
662. **ADVANCED CLINICAL AUDIOLOGY I (4).** Pr., CD 560, 561, 562, or COI. Audiometric calibration, instrumentation, and physical requirements for audiometry. Introduction to advanced audiometric techniques with an emphasis on evaluation of the peripheral auditory system.
663. **ADVANCED CLINICAL AUDIOLOGY II (4).** Pr., CD 560, 561, 562, or COI. Continuation of SC 662. Advanced techniques in differential diagnosis of auditory function emphasizing assessment of pseudohypoacusis, the central auditory system and the use of physiologic methods.
664. **AURAL REHABILITATION (4).** Pr., CD 560, 561, 562, or COI. Clinical and therapeutic management of persons with hearing disorders, including selection and use of individual and group amplifying systems and electro-acoustic measurement of hearing aid performance.
665. **INDUSTRIAL AUDIOLOGY (4).** Pr., CD 560 or COI. Measurement and control of environmental noise, industrial audiometry, medico-legal aspects, and conservation of hearing.
666. **PHYSIOLOGICAL ACOUSTICS (4).** Pr., CD 560, 561, 562, or COI. Review of the layout of the auditory pathways, instrumentation, psychoacoustics and electrophysiology of the auditory system, as well as literature related to normal audition.
667. **SEMINAR IN AUDIOLOGY (CREDIT TO BE ARRANGED.)** Pr., CD 560, 561, 562, or COI. Advanced treatment of contemporary topics and trends, as well as current research aspects of audiology. May be repeated for credit with change in topics.
668. **FIELD EXPERIENCE IN AUDIOLOGY (5-10).** S-U grading only. Full-time assignment in a speech and hearing facility, the choice being made from the following settings: university speech and hearing clinic, hospital, public school, and various community agencies serving speech- and hearing-impaired children and adults. May be repeated for a maximum of 10 hours credit. No more than 5 hours may be used for minimum requirements toward a master's degree.
669. **ADVANCED CLINICAL AUDIOLOGY III (4).** Rationale and procedures for evaluation of central auditory nervous system, including interpretation of test results.
690. **MANAGEMENT OF HEARING-IMPAIRED CHILDREN (4).** Familiarizes audiologists with the parameters involved in the management of hearing-impaired school aged children.

*Effective Fall, 1990, GPA of 2.5 required to enter this course.

**Effective Fall, 1990, GPA of 2.2 required to enter this course.

Computer Science and Engineering (CSE)

Professors Brown, *Acting Head*, and deMaine
Adjunct Professor Newhouse

Associate Professors Day and Phillips

Assistant Professors Arafah, Carlisle, Chang, Cross, Pancake, and Ward

Instructors Krishnaprasad and Slaminka

100. **INTRODUCTION TO PERSONAL COMPUTER APPLICATIONS (3).** LEC. 2, LAB. 2. Introduction to personal computers and software application packages including word processing, spreadsheets, and data base systems. Lab sessions provide a hands-on environment in which to master the basic skills required for proper utilization of each package. No prior knowledge of computers is assumed.
200. **FUNDAMENTALS OF STRUCTURED PROGRAMMING (4).** LEC. 3, LAB. 3. Coreq., MH 163. Introduction to time-shared computer systems and structured programming concepts; top-down development of programs; control structures and decision-making; program documentation.
204. **COMPUTER PROGRAMMING (3).** Pr., MH 151 or 161. Digital computer programming with emphasis on mathematical problems, using the FORTRAN programming language. (Not open to students with credit in IE 300 or CSE 200.)
220. **STRUCTURED PROGRAMMING II (5).** LEC. 4, LAB. 3. Pr., CSE 200. Fundamentals of program efficiency; representation of data types; debugging techniques; execution-time error detection and recovery; concepts of file organization and manipulation; access methods for sequential and random access files; data set organization.
300. **STRUCTURED PROGRAMMING FOR ENGINEERS AND SCIENTISTS (3).** Fundamentals of structured programming principles, including top-down program design, program documentation, and advanced problem solving for engineering and scientific applications using a structured programming language. (Not open to students with credit in CSE 200.)
301. **COBOL PROGRAMMING FOR INFORMATION SYSTEMS (3).** Pr., one high-level language programming course. An introduction to business and information systems software design with the COBOL programming language.
335. **MICROCOMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING (4).** LEC. 3, LAB. 3. Pr., EE 330. Stored program computers, hardware components, software components, data representation and number systems; instruction sets; addressing modes and assembly language programming; memory, memory cycles, and memory hierarchy; arithmetic/logic unit; control unit, program counter, and instruction cycle; input/output programming, and interrupts. (Credit is not allowed for both EE 335 and CSE 335.)
340. **DATA STRUCTURES (3).** Pr., CSE 200. Theory of data structures and their computer representations: lists; stacks; queues; deques; priority queues; trees; graphs.
350. **LARGESCALE COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING (3).** Pr., CSE 220. Introduction to the organization of largescale computer systems including: multiple instruction formats, management of base registers; alternate data formats, conversions, character string and bit manipulations, and non-integer arithmetic; control sections and translator independent linkage conventions; conditional assembly and macro processing.
360. **FUNDAMENTAL ALGORITHM DESIGN AND ANALYSIS (3).** Pr. CSE 340. Algorithm development using pseudo-languages; elementary program structures; classification of algorithms, e.g. recursive, divide-and-conquer, greedy; algebraic simplification and transformation; evaluation of polynomials; iteration; sorting; solving linear equations; basic search methods and backtracking.
400. **SYSTEMS PROGRAMMING PRINCIPLES I (3).** Pr., CSE 350. Review of machine structure, machine language and assembly language; introduction to the design of assemblers, macro processors, and loaders; overview of operating systems principles.
- 400L. **SYSTEMS PROGRAMMING LABORATORY (1).** Coreq., CSE 400. Design and implementation of an assembler, a macro processor, or a binder/loader as a comprehensive project.
405. **OPERATING SYSTEMS (3).** Pr., CSE 400. Structure and functions of operating systems; process state models and scheduling algorithms; memory management; interrupt processing; auxiliary storage management; disk scheduling algorithms and file systems; resource allocation policies and deadlock; protection; concurrent asynchronous processes; design strategies.
412. **DATABASE SYSTEMS I (3).** Pr., CSE 360. An introduction to database systems: basic concepts, storage structures, data models, and data sublanguages: relational, hierarchical, and network models.
422. **INTRODUCTION TO SOFTWARE ENGINEERING (3).** LEC. 2, LAB. 3. Pr., CSE 340. Tools and methodology for the design of complex software systems composed of integrated programs, data files, and user interfaces.
440. **FUNDAMENTALS OF COMPUTER GRAPHICS SYSTEMS (4).** LEC. 3, LAB. 3. Pr., CSE 340. Hardware and software components of computer graphics systems; display files, two-dimensional and three-dimensional transformations, clipping and windowing, perspective, hidden-line elimination and shading; interactive graphics; survey of applications.
490. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
498. **HONORS THESIS (3-6).** Pr., COI and department head approval. Individual student endeavor consisting of directed research and writing of honors thesis. (CSE Honors Program students only. May be repeated once for a maximum of 6 credit hours.)
499. **SPECIAL PROJECTS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.

ADVANCED UNDERGRADUATE AND GRADUATE COURSES

505. **OPERATING SYSTEMS DESIGN PRINCIPLES (3).** Pr., CSE 405, EE 430. Design and implementation strategies used in operating systems software to manage system resources; design problems in implementing multiprogramming and dynamic management of memory; design solutions to synchronizing and communicating with processes; managing time; design techniques used to process various classes of interrupts and to schedule processors.
512. **DATABASE SYSTEMS II (3).** Pr., CSE 412. Database system architecture and design methodology, with emphasis on the relational model. Design and implementation of a comprehensive database system as a coordinated project.
520. **THEORY OF FORMAL LANGUAGES I (3).** Pr., MH 371. A detailed study of mathematical models of regular sets, context-free languages, and Turing machines; deterministic and non-deterministic models, closure properties, normal forms, simplifications, and applications.
521. **COMPILER CONSTRUCTION (3).** Pr., CSE 520. Compiler organization; lexical analysis; LL and LR grammars and deterministic parsing; syntax-directed translation; error detection and recovery; compiler generation tools.
- 521L. **COMPILER CONSTRUCTION LABORATORY (1).** Coreq. CSE 521. Design and implementation of a high-level language compiler as a comprehensive project.
522. **SOFTWARE ENGINEERING I (4).** LEC. 3, LAB. 3. Pr., CSE 422. Design of reliable software; error causes and consequences; requirements, specifications, and objectives related to reliable design; software testing, test case design, test tools, path testing, and transaction flows; data validation and syntax charts; programming languages and reliability, proving program correctness, and reliability models.
523. **ADVANCED PROGRAMMING IN ADA (3).** Pr., senior standing or COI. Advanced topics in programming using Ada as an example of a language oriented toward software engineering applications; emphasis is placed on features for data abstraction, information hiding, and software component libraries.
524. **DISCRETE STRUCTURES (3).** Pr., MH 371. Mathematical logic, predicate calculus, set theory, graph theory, Petri Nets, algebraic structures, and theory of computation; developing a mathematical background for work in compilers, artificial intelligence, software engineering, and switching theory.
525. **ADVANCED PROGRAMMING IN C (3).** Pr., senior standing or COI. Advanced topics in programming using C as an example of a machine-oriented high-level language; facilities for preprocessing, indirect data manipulations, and operating system interfaces are emphasized.
530. **COMPUTER ARCHITECTURE AND DESIGN (4).** Pr., EE 430. Structural organization and hardware design of digital computers; register transfers; micro-operations, control units, and timing; instruction set design; microprogramming; automated hardware design aids. (Credit is not allowed for both EE 530 and CSE 530.)
531. **DESIGN OF MICROPROGRAMMED DIGITAL SYSTEMS (3).** Pr., CSE 530. Design of application-specific processors using bit-slice components and microprogrammed control. Students design and debug microprograms for an application-specific processor, using a special laboratory design module. (Credit is not allowed for both EE 531 and CSE 531.)
532. **COMPUTER NETWORKS (3).** Pr., EE 430. Introduction to distributed systems, network architectures, protocols, digital communication links, data management, and related software design. (Credit is not allowed for both EE 532 and CSE 532.)
533. **PARALLEL PROCESSING (3).** Pr., CSE 400, CSE 530. Hardware and software elements of multiprocessors, multicomputers, pipeline and array machines, and data flow architectures; design principles related to machine structures, control software and hardware, data storage and access, programming languages, and application algorithms. (Credit is not allowed for both EE 533 and CSE 533.)
534. **DISTRIBUTED COMPUTING (3).** Pr., CSE 530. Overview of distributed data processing concepts; hardware architectures and configurations; systems and application software design; problem design; interprocess communication; system performance evaluation; fault tolerance. Decentralized control, distributed operating systems, and distributed databases. (Credit is not allowed for both EE 534 and CSE 534.)
560. **ARTIFICIAL INTELLIGENCE I (4).** LEC. 3, LAB. 3. Pr., CSE 360, MH 371 or COI. Introduction to machine intelligence; computer vision; search; logic and deduction; abduction, uncertainty, and expert systems.
561. **ARTIFICIAL INTELLIGENCE II (3).** Pr., CSE 560. Introduction to natural language understanding, managing plans of action, language comprehension, and machine learning.
562. **LOGIC PROGRAMMING (3).** Pr., CSE 360, MH 371. Introduction to logic programming through representation, style, data structures, program verification, and implementation using Prolog.
- 571-572. **SENIOR DESIGN PROJECT (3-2).** Pr., CSE 422 and senior standing. Development of requirement definitions, architectural design specification, detailed design specification, testing plan, and documentation for the software and/or hardware components of a comprehensive project.
590. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.

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600. **ADVANCED SYSTEMS PROGRAMMING (3).** Pr., CSE 405 or COI. Interrupt handler design principles; data management macros, access methods, data channel programming; operating system generation, operating system modification, patching; operating system macro facilities programming; file structures and management.
605. **MODERN OPERATING SYSTEMS (3).** Pr., CSE 505 or COI. Modern operating systems design principles, multi-processor operating systems, computer systems performance modeling and evaluation, computer system security, survey of current literature on operating systems, and architectural support of operating systems.

612. **INFORMATION STORAGE AND RETRIEVAL (3).** Pr., CSE 412 or COI. Problems germane to automating libraries; systems analyses and evaluation; dynamic information processing; automatic query and document classification; comparison of Salton, Hillman, and DEACON methods.
613. **AUTOMATIC DEDUCTIVE SYSTEMS (3).** Pr., CSE 560 or COI. Definition and classification of automatic deductive systems; learning systems; examples of numeric and alphanumeric deductive systems.
618. **PROGRAMMING LANGUAGE DESIGN I (3).** Pr., CSE 521 or COI. A language-independent examination of the relationship between programming language design and implementation strategies, with emphasis on semantic and runtime representation issues. Includes data abstraction and encapsulation, exception handling, concurrent execution, dynamic storage management, and programming language environments.
619. **PROGRAMMING LANGUAGE DESIGN II (3).** Pr., CSE 521 or COI. Formal methods for the description of programming languages. Includes standard metalinguistic systems useful in defining concrete and abstract syntax as well as translational or interpretive semantics: attribute grammars; two-level grammars (W-grammars); operational, denotational, and axiomatic semantics.
620. **THEORY OF FORMAL LANGUAGES II (3).** Pr., CSE 520 or COI. Turing machines, recursively enumerable languages, and phrase structure grammars; context-sensitive languages and linear bounded automata; deterministic context-free languages and LR grammars; closure properties of families of languages; auxiliary pushdown automata, stack automata, indexed languages.
621. **COMPILER THEORY I (3).** Pr., CSE 521 or COI. Advanced topics in parsing algorithms, syntax-directed translation, intermediate representation, code generation, flow analysis, optimization, and translator writing systems.
622. **SOFTWARE ENGINEERING II (3).** Pr., CSE 522 or COI. Programming systems and languages, structured software design steps and automated design tools; requirements specification languages; program-to-program interfaces; verification and validation; simulation support tools.
623. **COMPUTATIONAL COMPLEXITY (3).** Pr., CSE 520 or COI. Turing machines and partial recursive functions; undecidability; hierarchy theorems and relations among complexity measures; nondeterministic hierarchies; NP-complete problems; provably intractable problems.
624. **PETRI NETS AND CONCURRENT SYSTEM MODELING (3).** Pr., CSE 520 or COI. Theory and application of Petri Nets; modeling and analysis of computer hardware and software; concurrency and conflict; complexity and decidability; Petri Net languages; related models of parallel computation.
625. **SOFTWARE ENGINEERING ENVIRONMENTS (3).** Pr., CSE 522 or COI. Survey of state-of-the-art software engineering environments for the automated support of requirements, analysis, and specification, design specification, code generation, testing, maintenance, and project management.
630. **COMPUTER ARCHITECTURE I (4).** Pr., CSE 430 or COI. Structural organization and hardware design of digital computers, hardware description languages, register transfers, micro-operations, control units and timing, instruction set design, and microprogramming. Students design and simulate a central processing unit.
631. **MICROPROGRAMMING AND BIT-SLICE DESIGN (3).** Pr., CSE 530 or COI. Design of application-specific processors using bit-slice components and microprogrammed control units. Students design, implement, and debug microprograms for a given application.
632. **COMPUTER NETWORKS AND DATA COMMUNICATIONS (3).** Pr., CSE 430 or COI. Introduction to computer networks, the OSI layered network model, local and wide-area networks, applications, and case studies.
633. **PARALLEL AND CONCURRENT PROCESSING (3).** Pr., CSE 530 or COI. Hardware and software elements of multiprocessors, pipeline, and array machines, and data flow architecture; interprocessor communication, parallel system performance evaluation, control hardware and software, data storage and access, programming languages, application algorithms, and case studies.
634. **DISTRIBUTED DATA PROCESSING I (3).** Pr., CSE 530 or COI. Overview of distributed data processing concepts, hardware architectures, systems and application software, algorithm design, interprocess communication, system performance evaluation, fault tolerance, decentralized control, distributed databases, and case studies.
660. **KNOWLEDGE ENGINEERING AND EXPERT SYSTEMS (3).** Pr., CSE 560 or COI. Basic concepts for the construction of expert systems and their related architecture; tools and languages for knowledge engineering analysis and design; case studies of expert systems.
665. **MACHINE LEARNING (3).** Pr., CSE 560 or COI. Overview of current methods and case studies of machine learning, including learning from examples, learning in problem-solving, learning from observation and discovery, and learning from instruction.
690. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
695. **CSE SEMINAR (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
700. **ADVANCED TOPICS IN SYSTEMS PROGRAMMING (3).** Pr., CSE 405 or COI. Selected topics in advanced systems programming. Case studies of multi-level support systems such as catalog management systems, special-purpose access methods, programming environments, and runtime environments.
705. **SPECIAL TOPICS IN OPERATING SYSTEMS (3).** Pr., CSE 505 or COI. Operating system design principles for multiprocessor and special-purpose architectures; techniques for system performance analysis and evaluation.
712. **ADVANCED INFORMATION STORAGE AND RETRIEVAL (3).** Pr., CSE 412 or COI. Current techniques for storing, retrieving, and managing information, with emphasis on text processing systems.
713. **ADVANCED AUTOMATIC DEDUCTIVE SYSTEMS (3).** Pr., CSE 560 or COI. Definition and classification of automatic deductive systems; learning systems; examples of numeric and alphanumeric deductive systems.

718. **ADVANCED TOPICS IN PROGRAMMING LANGUAGE DESIGN (3).** Pr., CSE 618 or COI. Topics in programming language design and implementation, selected from such areas as standards definition and enforcement, formal specification models for non-procedural languages, and language support for specialized activities such as object-oriented programming, pattern matching, simulation, or robotics.
721. **COMPILER THEORY II (3).** Pr., CSE 521 or COI. Advanced topics in compiler theory, with emphasis on non-syntactic aspects of compiler design.
722. **ADVANCED SOFTWARE ENGINEERING (3).** Pr., CSE 522 or COI. Advanced concepts in design languages; principles of abstraction in the design of large computer systems; simulation; automatic code generation; comprehensive software engineering environments.
725. **ADVANCED SOFTWARE ENGINEERING ENVIRONMENTS (3).** Pr., CSE 522 or COI. Selected topics in software engineering environments, including a survey of experimental systems for automated support of requirements analysis and specification, design specification, code generation, testing, maintenance, and project management.
730. **COMPUTER ARCHITECTURE II (3).** Pr., CSE 530 or COI. Computer architecture and design principles; computer structures; partitioning; pipelining; vector processing; multiprocessing; case studies.
731. **ADVANCED TOPICS IN COMPUTER ARCHITECTURE (3).** Pr., CSE 530 or COI. Current topics in the field of computer architecture, with emphasis varying according to current research interests. May be taken more than one quarter.
732. **DESIGN AND ANALYSIS OF COMPUTER NETWORKS (3).** Pr., CSE 532 or COI. Layered communication architectures, SNA and X.25 protocol. Performance evaluation of communication networks and systems using queueing theory. Design and analysis of packet switching and circuit switching networks. Principles of integrated services digital networks.
733. **THEORY OF CONCURRENT SYSTEMS (3).** Pr., CSE 533 or COI. The theory of concurrent computer architectures and research in multiple processor computing environments.
734. **DISTRIBUTED DATA PROCESSING II (3).** Pr., CSE 531 or COI. Advanced topics in distributed data processing, including decentralized control and distributed operating systems, fault tolerance techniques for distributed systems, dynamic reconfiguration of resources, and applications of distributed networks.
735. **FAULT TOLERANT COMPUTING (4).** Pr., CSE 530 or COI. Architecture and design of fault tolerant computer systems using protective redundancy, estimation of the reliability and availability of fault tolerant systems, error recovery, and fault diagnosis.
760. **SPECIAL TOPICS IN KNOWLEDGE-BASED SYSTEMS (3).** Pr., CSE 560 or COI. Methodologies for knowledge acquisition and representation, inference, conflict resolution, and explanation; study and comparison of knowledge-based system development tools.
790. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Consumer Affairs (CA)

Professors Turner, Head, McCord, and Trentham

Associate Professors Anderson, Barry, Beamish, Hardin, Slaten, Waddell, and Warfield

Assistant Professors Aycok, Brannon, Cavender, Christman, Clem,

Duffield, Hill, and Potter

Instructors Carter, Holloway, and Ulrich

115. **CLOTHING AND MAN (3).** Cultural, aesthetic, functional, and technological factors as they interact to determine the meaning and use of clothing and textiles for the individual and society.
116. **ART FOR LIVING (3).** A working knowledge of basic concepts in the organization and evaluation of design with emphasis placed upon the contribution of design and color as enrichment of individual and family environment.
- 116L. **ART FOR LIVING LABORATORY (2).** LAB. 4. Pr., CA 116 or concurrently. Provides the opportunity for individuals to explore color and design concepts through the manipulation of materials, tools, and processes and to obtain design evaluation experience.
121. **SPATIAL ANALYSIS (3).** STUDIO 9. Pr., CA 116 and CA 116L. Principles and elements of three-dimensional design, with particular application to the built environment. Perceptual awareness and communication skills are emphasized through experiences in various design and communication media. Abstract and representational models are used in spatial design problem analysis.
140. **APPAREL PRODUCTION I (5).** LEC. 3, LAB. 4. Pr., CA 115. Introduction to the apparel industry, apparel production methods and terminology.
200. **MANAGEMENT FOR CONSUMERS (4).** Management of consumer resources, with emphasis on decision-making and problem-solving skills over the life cycle.
201. **RETAIL PRICING (3).** Pr., MH 140. Basic understanding and application of pricing principles involved in operating a retail establishment.
205. **TEXTILE AND APPAREL PRODUCTS: MERCHANDISING AND CONSUMPTION (3).** Pr., CA 115, CA 116, CA 116L or equivalent. Emphasis on textile and apparel products and the principles that guide consumption aspects as related to individuals at all stages of the life cycle.
206. **GARMENT STRUCTURES — THEORY AND APPLICATION (3).** LEC. 1, LAB. 4. Pr., CA 140. The materials, strategies, processes, and sequences in shaping fabric to the human form; the interaction of these factors in determining function and quality.

215. **SURVEY OF THE DECORATIVE ARTS (5).** Pr., AT 171-173. Historical survey of the stylistic and technical development of the decorative arts, including furniture and other interior decorative objects.
216. **ART FOR LIVING II (3-5).** (3) **LEC. 2, LAB. 2.** (5) **LEC. 2, LAB. 6.** Pr., CA 116, 116L or equivalent. A continuation of the individual's artistic environment with emphasis on the application of principles of design and color to specific problems of everyday life.
220. **CONSUMER HOUSING (3).** Investigation of factors affecting consumer housing choices.
221. **RESIDENTIAL SPACE PLANNING (4).** **LEC. 2, STUDIO 6.** Pr., CA 220. Analysis and development of residential space design. Survey of residential building materials, systems, and operations. Introduction to design communication using two-dimensional drawings, schedules, and specifications.
222. **FURNISHINGS FOR INTERIORS (4).** Pr., CA 116 or equivalent. Introduction to the functional and aesthetic aspects of furnishing residential spaces. An application of principles of color and design in furnishings plans. Overview of decorative and functional materials and components.
223. **INTERIORS (4).** **LEC. 2, LAB. 6.** Pr., CA 121, 221, 222 and 255, BSC 100. Fundamentals of the design process for interior space. Methods of establishing design programming and conceptualization from data gathering and problem solving techniques. Organization of the design presentation.
224. **FUNDAMENTALS OF VISUAL PRESENTATION (2).** **STUDIO 6.** Pr., BSC 100. Introduction to basic skills, materials, and techniques employed in the visual and verbal presentation of interior furnishings designs.
226. **FASHION SKETCHING (3).** **LAB. 6.** Pr., CA 116, 116L or equivalent. Provides for the fashion merchandising or clothing design major simple methods of communicating apparel designs through quick sketches to portray fashion in silhouettes, texture, and color.
233. **RESIDENTIAL EQUIPMENT/ENERGY MANAGEMENT (4).** **LEC. 3, LAB. 3.** Pr., PS 200. Residential equipment, major and small appliances: emphasis on product design and function, product standards, energy utilization, and management.
255. **TEXTILES FOR INTERIORS (3).** Pr., CA 115 or COI. Fibers, yarns, fabrics, and finishes of textile products with emphasis in their application to interiors. Credit will not be allowed for both CA 305 and CA 255.
305. **TEXTILES (5).** Pr., CH 203. Polymers, fibers, yarns, fabrics, and finishes in their relationship to apparel and household textiles. Credit will not be allowed for both CA 305 and CA 255.
316. **FASHION ANALYSIS (5).** Pr., CA 205. The dynamic nature of fashion and the interacting forces which shape fashion trends in apparel.
323. **MAN THE CONSUMER (3).** Pr., junior standing or COI. All quarters. Management of family resources and consideration of alternatives available to families as consumers. Consumer problems, use of information sources, and analysis of laws protecting consumers.
324. **ADVANCED VISUAL PRESENTATION (3).** **STUDIO 9.** Pr., CA 222, 224. Advanced techniques and methods of color application to visual presentation of furnishings and interiors.
325. **FASHION MERCHANDISING (5).** Pr., MT 331, 333. Application of principles and practices of merchandising to the retailing of consumer goods and services.
333. **LIGHTING DESIGN (5).** **LEC. 3, STUDIO 6.** Pr., CA 224, 233, or COI. Application of functional and aesthetic concepts and techniques of lighting design. Evaluation of materials and controls, energy utilization, aesthetic quality. Lighting design layouts and specifications.
334. **INTRODUCTION TO INTERNSHIP (2).** Pr., junior standing or COI. Prepares students for maximum utilization of supervised professional internship.
340. **APPAREL PRODUCTION II (5).** **LEC. 2, LAB. 6.** Pr., CA 140, ACF 215. Coreq., CA 305. Planning and problem-solving throughout the apparel production process.
342. **ANALYTICAL INSTRUMENTATION IN TEXTILES (3).** **LEC. 2, LAB. 2.** Pr., all Basic Textile courses, TE 241. Use of specialized analytical instrumentation to assist in the production of textile products; as means to solve problems of color mixing, waste water characterization, dust measurement, and the identification of materials. Systems control by instrumentation is also included.
345. **CREATIVE CRAFTS (1-2-3).** **LAB. 2-4-6.** Creative design and execution of a variety of current crafts. Outside research required.
353. **BUSINESS PRACTICES IN INTERIOR FURNISHINGS (5).** Pr., CA 223. Analysis of current developments in the interior furnishings business market. Professional practices within the business setting. Overview of furnishings merchandising, including purchasing, promotion, and salesmanship. Estimation of interior decorative materials.
363. **ENVIRONMENTAL SYSTEMS/ENERGY MANAGEMENT (3).** **LEC. 3.** Pr., CA 233, PS 200. Equipment, physical layout, and management of environmental systems for human comfort and conservation.
385. **CREATIVE WEAVING (3).** Weaving design and experience in selecting yarns, setting up a loom, and weaving one's own fabric.
395. **APPAREL DESIGN (3).** **LEC. 1, LAB. 4.** Pr., CA 206, 226. Principles of design, structure, and production as they guide designing of apparel within the fashion and cultural context.
398. **PROFESSIONAL PLANNING AND DEVELOPMENT (1).** Pr., junior standing or COI. Professional development course designed to assist human sciences students in the transition from student to professional.
399. **EXPERIENTIAL LEARNING (1-6).** Pr., sophomore standing and COI.
422. **KITCHEN AND BATH PLANNING (4).** **LEC. 2, STUDIO 6.** Pr., CA 223, 324, 333, 363. Aesthetic and technical elements of kitchen and bath design.

423. **RESIDENTIAL INTERIORS (4). LEC. 1, STUDIO 9.** Pr., CA 215, 353, and 422. Creative development of residential interiors for specific clients focusing on the interrelationships of multiple interior spaces. Strategies used in planning furnishings as a component in the housing market. Introduction to the design team approach.
424. **NON-RESIDENTIAL INTERIORS (4). LEC. 2, STUDIO 6.** Pr., CA 324, 333. Coreq., CA 363. Analysis and development of non-residential interior spaces and application of human behavioral elements in the design process. CA 363 must be taken concurrently or prior to CA 424.
431. **MAN-ENVIRONMENT RELATIONS (2).** Pr., Human Sciences core courses or COI. The unifying principles and ideals, which are concerned with man's immediate physical environment (housing, clothing, food) and with his nature as a social being. Analysis and synthesis of principles explored in Human Sciences core courses CA 113, 115, 116, NF 112, FCD 157, and CA 323.
435. **INTERNSHIP IN RETAILING (13).** Pr., CA 325, 334. Ten weeks paid experience, with a domestic or global firm in the textiles or apparel industry. Supervised professional experience to include product development, marketing, retailing, or consumer relations.
436. **INTERNSHIP IN INTERIORS AND HOUSING (13).** Pr., senior standing; approval of internship application by IH faculty. Supervised professional internship in interiors and housing.
438. **INTERNSHIP IN CONSUMER AND FAMILY ECONOMICS (13).** Pr., departmental approval of application. Supervised professional experience. Participating firm or agency selected with faculty approval.
470. **ALLOCATION OF FAMILY RESOURCES (5).** Pr., FCD 270, CA 323, 431, or COI. Family goal setting and decision making; human and material resource allocation processes at all socioeconomic levels.
478. **VISUAL MERCHANDISING (3). LEC. 2, LAB. 2.** Pr., junior standing, CA 116 or equivalent, MT 331 or COI. Exploration of history, equipment, application, and theory of display techniques. Emphasis is on displays in windows and interior store settings.
490. **INDEPENDENT OR FIELD STUDY (1-8).** An individual problems course involving directed readings and/or laboratory or field experiences under the direction of a faculty member on some problem of mutual interest. Field experiences may include work with families, business, or industry.

ADVANCED UNDERGRADUATE AND GRADUATE

505. **APPAREL DESIGN THROUGH DRAPING (5). LEC. 2, LAB. 9.** Pr., 8 quarter hours of clothing construction. Creative experience in development and execution of apparel designs through draping varied fabrics on individualized body structures. Exploration and application of theories, philosophies, and practices of contemporary designers.
511. **APPAREL DESIGN FOR SPECIAL NEEDS (2).** Pr., CA 115, SY 201, PG 211 and junior standing. The physical, psychological, and social facets of selecting, adapting, and designing apparel for special needs of people.
- 511L. **APPAREL DESIGN FOR SPECIAL NEEDS LABORATORY (2). LAB (4).** Pr., CA 395 and junior standing. Coreq. CA 511. Concepts learned in CA 511 are applied to laboratory problems.
513. **HOUSING FOR SPECIAL NEEDS (4). LEC. 4.** Pr., CA 220, PG 211 or equivalent, or COI. Examination of physical, social, economic, and psychological needs of the elderly and handicapped in relation to their home and community environments. Emphasis on evaluation of housing alternatives for both groups.
514. **SOCIAL PROBLEMS OF HOUSING (5).** Pr., CA 220 or equivalent, or COI. Current housing policies explored as both causes of and solutions to certain social problems. Zoning and exclusionary practices, public housing, cash subsidies for housing examined.
515. **HISTORY OF TEXTILES (5).** Pr., AT 171, 172, 173 or HY 101, 102, 103. The development of the textile industry and of fabric design from the earliest times to the present day.
516. **APPAREL QUALITY ANALYSIS (5).** Pr., CA 140 and 325 or equivalent and junior standing. Analysis of quality variations of soft goods and study of factors affecting quality of materials, manufacturing processes, markets, and resources.
521. **WORLD APPAREL, TRADE, PRODUCTION, AND DISTRIBUTION (4).** Pr., MT, 331 or COI. The large textile and apparel manufacturers who have units outside the U.S., foreign apparel companies who have plants in the U.S., international trade agreements and other factors which influence international trade in textiles and apparel.
523. **GOVERNMENT AND THE RETAILER (5).** Pr., junior standing, COI. Informative, statistical, and regulatory aspects of governmental departments and agencies affecting textiles and clothing retail operations.
524. **PLANNED CHANGE IN THE FASHION INDUSTRY (5).** Pr., CA 325 or COI. The process involved in initiating and implementing change in the fashion industry.
525. **HISTORY OF COSTUME (5).** Pr., AT 171, 172, 173 or HY 101, 102, 103. Evolution of Western costume from prehistoric time to present day.
528. **CONSUMER ECONOMICS (5).** Pr., EC 202 and CA 200 or COI. Consumption as an economic activity; theory of consumer choice. The consumer's role in the American economy; impact of various market structures on the consumer; consumer protection; economic issues affecting the consumer.
530. **CONSUMER/FAMILY ECONOMIC ISSUES AND PUBLIC POLICY. (3).** Pr., EC 202 and CA 200 or COI. Investigation of the impact of consumer and family oriented laws and policies on individuals/families. Exploration of individual/family involvement with public policy and legal resources as a means for realizing satisfying lifestyles.
535. **TEXTILE TESTING (5). LEC. 2, LAB 6.** Pr., CA 305 or equivalent. Standard testing procedures and equipment used in determining the physical and chemical characteristics of fibers, yarns, and fabrics, and of the statistical methods employed in data evaluation.
538. **STUDY/TRAVEL IN CONSUMER AFFAIRS (2-8).** Course may be repeated for a maximum of 12 undergraduate credits or 8 graduate credits. Pr., junior standing, COI. Concentrated study in clothing, textiles, interiors and housing, or merchandising in U.S. or foreign locations which offer unique resources for investigation in one of these content areas. Lectures presented at pre-arranged points. Papers required on selected phases of the course.

540. **ADVANCED APPAREL PRODUCTION (5). LEC. 1, LAB. 8.** Pr., CA 316, 340, 516, 535. Integration of the design, production, and marketing of apparel utilizing a team approach and emphasizing decision-making skills.
541. **FAMILY FINANCIAL MANAGEMENT (5).** Pr., CA 200 or COI. Family financial planning, including short-term money management, long-term planning, allocation of family resources, and use of credit.
555. **APPAREL DESIGN THROUGH FLAT PATTERN (5). LEC. 2, LAB. 8.** Pr., CA 395. Pattern blocking in pattern production. Foundation sloper developed for pattern drafting. Consideration given to figure variations and their effect on styling and production.
556. **COMPARATIVE METHODS OF APPAREL PRODUCTION (5). LEC. 2, LAB. 6.** Pr., 8 quarter hours of clothing construction. End-use qualities of apparel in relation to options in methods of production and organizational procedures. Implications for consumer decisions and industrial quality control and pricing.
560. **TEXTILE FINISHES (4).** Pr., CA 305 or equivalent, junior standing. Chemistry and mechanics involved in finishing textile materials. Properties of finished fabrics related to end use.
- 560L. **TEXTILE FINISHES LABORATORY (1). LAB. 3.** Coreq. CA 560. Techniques of textile finishing. Analysis and evaluation of finishes.
575. **CREATIVE TEXTILE DESIGN (5). LAB. 9, OUTSIDE WORK TO BE ARRANGED.** Pr., CA 116, 116L, or AT 121. Introductory techniques used in the creative decoration of fabric, with experience in the execution of these techniques for both fashion and interior textiles.
576. **ADVANCED PRINTING AND DYEING. A. DISCHARGE AND RESIST PRINTING; B. BLOCK PRINTING; C. SCREEN PRINTING. (3-3-3). LAB. 6.** Pr., CA 575, junior standing. May be repeated for a maximum of 9 credits. Techniques of each type of printing and dyeing studied. Development of designs for hand printing and commercial application. Outside research required.
580. **PROBLEMS IN DESIGN. A. CLOTHING; B. TEXTILE DESIGN; C. CLOTHING AND TEXTILE DESIGN; D. INTERIORS AND HOUSING (3-5). LEC. 1, LAB. 9-12.** Pr., for A, CA 505 and 555; for B, C, and D, foundation courses in the field, COI. Creative work integrating methods, materials, and processes in solution of specified design problems. May be repeated and combined for a maximum of 10 hours.
581. **INTERNSHIP IN THE APPAREL INDUSTRY (13).** Pr., CA 334, 540 or 580 and approval of internship supervisor. Supervised professional experience in apparel design and/or production.
583. **SOILING AND DETERGENCY OF TEXTILES (5). LEC. 4, LAB. 2.** Pr., PS 200 or COI, CA 305 or equivalent. Physical and chemical principles involved in textile soil deposition and removal. Effect of soil removal methods on functional properties of textile materials.
586. **RUG WEAVING (5). LAB. 15.** Pr., CA 385. Various rug weaving techniques, history, development, use in hand weaving, and application to commercial production.
587. **ADVANCED PATTERN WEAVING (5). LAB. 15.** Pr., CA 385. Advanced pattern weaves used in hand weaving and applicable to commercial production.
588. **EXPERIMENTAL WEAVING (5).** Pr., CA 586, 587. Experimental work with yarns, fibers, and related materials, while initiating and solving individual creative problems using advanced weaving techniques. Allows for student interaction and further preparation of portfolio work.

GRADUATE

601. **SEMINAR. A. CLOTHING; B. TEXTILES; C. DESIGN; D. HOUSING; E. GENERAL (1-5).** May be taken more than one quarter in residence for a maximum of 10 credits.
605. **METHODS OF RESEARCH IN HUMAN SCIENCES (3).** Pr., BY 501 or MN 274 or 570. Research and investigation methods applicable to the various areas of Human Sciences. Required of all graduate students in Human Sciences.
609. **SPECIAL PROBLEMS. A. CLOTHING; B. APPAREL DESIGN; C. TEXTILES; D. TEXTILE DESIGN; E. HOUSING; F. CONSUMER AND FAMILY ECONOMICS; AND G. HISTORIC COSTUMES AND/OR TEXTILES (2-5).** Pr., COI. May be repeated and combined for a maximum of 15 hours.
610. **ADVANCED DESIGN STUDIO. A. APPAREL DESIGN; B. TEXTILES DESIGN; C. APPAREL AND TEXTILE DESIGN; D. HISTORIC COSTUME AND/OR TEXTILES (3-5). LEC. 1, LAB. 5-9.** Pr., foundation courses in the field, COI. Advanced program for synthesizing study and creative work in student's selected field. May be repeated and combined for a maximum of 15 hours.
630. **RECENT RESEARCH IN CONSUMER AND FAMILY ECONOMICS (3).** Pr., EC 200, 202, SY 220, CA 528, and COI. Synthesis of recent research dealing with development and trends in consumer and family economics.
631. **READINGS IN CONSUMER AND FAMILY ECONOMICS (1-4).** Pr., CA 200, EC 202 or COI. Independent readings in consumer and family economics.
632. **RESEARCH TECHNIQUES IN HOUSING (5). LEC. 4, LAB. 1.** Pr., statistics and COI. Housing research with particular emphasis on survey methods and data analysis.
633. **FAMILY HOUSING (5). LEC. 5.** Pr., EC 200, SY 201, CA 220 or equivalent. The effects of housing on socio-psychological aspects of the individual and family; economic, legal, and social implications; present trends.
634. **THE FAMILY IN THE AMERICAN ECONOMY (3).** Pr., EC 200, 202; CA 528 or COI. Analysis of the family as an economic unit; standards and levels of living; hazards in the family economy. Examination of the economic effect of government policies and programs on the family.
636. **FAMILY RESOURCE DEVELOPMENT AND ALLOCATION (3).** Pr., EC 200, 202, and CA 634 or COI. Economic analysis of conditions, programs, and policies related to development and use of human and non-human resources, with special reference to impact on families and households.

650. **SOMATOMETRY AND GARMENT STRUCTURES (4).** LEC. 2, LAB. 5. Pr., undergraduate courses in clothing and textiles, COI. Theoretical base of problems involved in building garments. Body contour analysis used to plan pattern adjustments. Management of materials, equipment, and processes in garment styling and construction.
652. **CLOTHING AND TEXTILES LITERATURE (5).** A critical examination of the current literature in the fields of clothing and textiles.
653. **ECONOMICS OF CLOTHING AND TEXTILES (5).** Pr., EC 200, CA 205 or equivalent and COI. Examination of literature on economics of clothing and textiles. Modern trends in manufacture, distribution, and consumption, with government regulations, labor laws, and international implications.
658. **CHEMICAL AND PHYSICAL ANALYSIS OF TEXTILES (5).** LEC. 3, LAB. 4. Pr., CH 207. The theory and application of chemical and physical analytical methods to textiles.
659. **FIBER FORMING POLYMERS (5).** Pr., CH 203 or CH 207. The dependence of fiber properties on the chemical formula, the molecular arrangement, and the morphology of polymers. The influence of chemical and physical treatments on polymers and ultimate fiber properties.
662. **PRACTICUM IN CONSUMER AND FAMILY ECONOMICS (2-8).** May be repeated for a maximum of 8 hours of credit. Pr., departmental approval.
667. **CLOTHING AND BEHAVIOR (5).** Pr., basic courses in Sociology, Psychology, and COI. Clothing as a factor in the physical, social, and psychological environment of man, his response to and use of clothing as an aspect of individual behavior and culture.
669. **PERSONALITY PROJECTION THROUGH CLOTHING (3).** Pr., CA 667; FCD 610 or PG 433 or equivalent. Psychological processes and theories of personality in relation to clothing-oriented behavior, as supported by research. Emphasis is placed on the interrelationships among the self, the body, and clothing at stages of the life cycle.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** Required of all students under the Thesis Option in any field.

Counseling and Counseling Psychology (CCP)

Professors Meadows, Head, Donnan, Moracco, and Valine
Associate Professors Buckhalt, Byrd, Pipes, and Westfeld
Assistant Professors McConatha and Short

Prerequisites and corequisites in the Department of Counseling and Counseling Psychology are experience in appropriate fields and employment or professional objectives leading to employment in public school counseling, psychoeducational diagnosis (school psychometry), rehabilitation counseling, mental health counseling, counselor education, college student personnel work, or counseling psychology. CCP 621, 622, or equivalent, is a prerequisite or corequisite to advanced study.

101. **CAREER EXPLORATION AND PLANNING (2).** Helps undeclared freshmen in planning careers.
223. **HUMAN RELATIONS TRAINING FOR THE HEALTH PROFESSIONS (2).** Human relations skills for health care providers; study and practice of the communication process with individuals and in small groups. Limited to students in the health professions.
321. **LEADERSHIP IN STUDENT DEVELOPMENT (3).** Pr., sophomore standing and COI. For students interested in increasing their understanding and skills in group dynamics and leadership. Particular attention will be paid to application of course content and activities to current co-curricular programs in which students are involved.
322. **HUMAN RELATIONS TRAINING IN TEACHER EDUCATION (2).** Students are trained in facilitative communication skills which would lead to (1) a deeper understanding of students and the learning process; (2) a more positive working relationship with peers; (3) more efficient methods of classroom management and conflict resolution; and (4) more effective use of support personnel in the school system.

ADVANCED UNDERGRADUATE AND GRADUATE

521. **COUNSELING AND HUMAN SERVICES (4).** Counseling concepts and skills appropriate in the helping professions. Not open to graduate students in Counselor Education.
522. **INTRODUCTION TO COUNSELING THE EXCEPTIONAL INDIVIDUAL (4).** Pr., CCP 322. Development of interpersonal relationship skills for persons interested in working with the disabled-physical, mental, social, or mental retardation. Emphasis upon unique aspects of these skills to the handicapped.
523. **MEDICAL ASPECTS OF DISABILITY (3).** Pr., COI. Orientation to medical aspects of the disabled individual. Understanding and working cooperatively with medical personnel effectively in the rehabilitation process.
524. **COMMUNITY RESOURCES IN REHABILITATION (3).** The utilization of community resources in furthering the rehabilitation of the disabled individual; the vocational rehabilitation worker as a referral source; and the utilization of those in the community in a coordinated approach to total rehabilitation of the individual.
525. **ADJUSTMENT ASPECTS OF DISABILITY (3).** Psychological and social variables associated with adjustment to disability.

GRADUATE

601. **ETHICAL, LEGAL, AND PROFESSIONAL ISSUES IN COUNSELING PSYCHOLOGY I (2).** The historical and current forces, persons, and organizations influencing the profession of counseling psychology. Includes an introduction to ethical and legal principles which guide the behavior of psychologists in general and counseling psychologists in particular.
602. **ETHICAL, LEGAL, AND PROFESSIONAL ISSUES IN COUNSELING PSYCHOLOGY II (3).** Advanced ethical and legal principles which guide the behavior of psychologists in general and counseling psychologists in particular.
610. **REHABILITATION PROGRAMS, PROFESSIONS AND SERVICES (4).** Pr., COI. and graduate standing. History, parameters, career opportunities, and issues in vocational rehabilitation and roles of various professionals. (This course is also offered as RSE 610.)
621. **INTRODUCTION TO COUNSELING AND THE COUNSELING PROFESSION (4).** Enables students to develop a conceptual framework for viewing the inter-relationship of guidance and counseling in terms of (1) personal and social factors and (2) their place in a comprehensive program of student personnel work.
622. **INTRODUCTION TO REHABILITATION COUNSELING (4).** Pr., graduate standing. Counseling process in the rehabilitation setting including basic helping skills. Focusing on the professional, legal, and ethical responsibilities of the counselor.
624. **MEDICAL AND ADJUSTMENT ASPECTS OF DISABILITY II (4).** Pr., CCP 523. A continuation of CCP 523. Focuses on rehabilitation with the chronically disabled.
625. **INTERNSHIP (5-15).** Supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled, on-campus discussion periods for positive evaluation and analysis of the intern experience.
626. **CASE MANAGEMENT IN REHABILITATION COUNSELING (4).** Pr., CCP 622 or COI. A critical analysis of representative rehabilitation cases; and case records. Attention is focused on process, diagnosis, and provision of services.
627. **PROBLEMS IN GUIDANCE (4).** Pr., COI. Develops competency in the application of counseling theory and research findings, with special emphasis on educational problems.
628. **COUNSELING THEORY AND PRACTICE I (4).** LEC. 3, LAB. 4. Pr., or coreq., CCP 621 or 622. Presents alternative theoretical strategies of counseling; prepares the student for further study of the theoretical and practical aspects of counseling; and provides field opportunities for practical application of theoretical concepts.
629. **COUNSELING THEORY AND PRACTICE II (4).** Pr., CCP 628. A continuation of CCP 628.
630. **GROUP DYNAMICS IN COUNSELING (4).** Pr., CCP 621. Contemporary theories and analysis of concepts, models and pertinent research in group dynamics as it pertains to counseling.
631. **GROUP PROCEDURES IN COUNSELING (4).** Pr., CCP 621, 628. The history, philosophy, and principles of group counseling and guidance. Includes pertinent research, and the dynamics of group interaction in counseling settings.
632. **ORGANIZATION AND ADMINISTRATION OF GUIDANCE PROGRAMS (4).** Pr., or coreq., CCP 621. For administrative and guidance personnel. Topics discussed include principles of administrative practice, role of staff in regard to the guidance program, organizational patterns for guidance programs, possible ways of initiating a guidance program, and means of evaluation.
633. **ANALYSIS OF THE INDIVIDUAL (4).** Pr., or coreq., CCP 621; Pr., PG 515. Emphasizes knowledge, understanding and skill necessary to obtain records and appraise information about the client as an individual and as a member of a group.
634. **COUNSELING IN THE ELEMENTARY SCHOOL (4).** Pr., CCP 621. Counseling and related activities are considered in the scope of pupil personnel activities as a developmental process in the elementary school.
635. **PLACEMENT SERVICES IN REHABILITATION COUNSELING (3).** Pr., CCP 622 or COI. Processes and procedures in placement of the handicapped including job modification, development, and analysis with special attention to the severely handicapped.
636. **VOCATIONAL APPRAISAL (4).** Pr., PG 515 or equivalent and COI. Appraisal of interest, aptitude, and personality tests used in the process of counseling with individuals confronted with vocational decisions. Laboratory practice in test administration, scoring, interpretation, and reporting.
637. **THEORIES OF VOCATIONAL DEVELOPMENT (4).** Pr., CCP 621 or COI. Theories of vocational development with special emphasis on the integration and practical application of the theories in counseling.
638. **INFORMATION SERVICES IN GUIDANCE AND COUNSELING (4).** Pr., or coreq., CCP 621 or 622. Educational and occupational information services and their relationship to counseling.
640. **PROFESSIONAL ISSUES IN SCHOOL PSYCHOLOGY (4).** Pr., admission to school psychology program, or COI. Professional roles and standards; ethical and legal concerns; current issues affecting professional practice.
641. **CONSULTATION (4).** Pr., CCP 628 or COI. Theory, process, and content of consultation for counselors and school psychologists.
642. **COMMUNITY COUNSELING (4).** History, structure, and function of community-based human service agencies with an emphasis upon preventive and educational models.
646. **DIRECTED INDEPENDENT STUDY (1-6).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
647. **SUPERVISORY PROCEDURES IN REHABILITATION COUNSELING (4).** Pr., EDL 620 and COI. Procedures and practices specific to the supervision of rehabilitation counselor and counselor-related services in rehabilitation agencies.

- 650. **SEMINAR IN AREA OF SPECIALIZATION (1-5).** Pr., COI. May be repeated for credit not to exceed 10 hours. Provides for advanced graduate students and professors to pursue cooperatively selected concepts and theoretical formulations.
- 651. **COUNSELING DIVERSE POPULATIONS (3).** Pr., COI. Discussion of the major issues involved in the counseling of diverse populations, e.g. Blacks, Hispanics, Asian Americans, Native Americans.
- 653. **COUNSELING PROGRAMS IN HIGHER EDUCATION (4).** Pr., CCP 621. Integration of counseling functions within the total student personnel program in higher education, legal and ethical aspects of counseling and student personnel work, and communication problems between groups within the institution and community.
- 654. **COLLEGE STUDENT DEVELOPMENT (4).** Pr., EDL 663. Developmental characteristics of college students, student cultural and environment, student movements, research concerning the diversity of college student population and implications for counseling and student personnel programs.
- 655. **ADULT DEVELOPMENT AND COUNSELING (4).** Pr., CCP 62B. Theories of normal adult development with special emphasis on the integration and practical application of the theories in counseling.
- 656. **RESEARCH AND EVALUATION IN COUNSELING (4).** Pr., FED 661, COI. Measurement, appraisal, and evaluation of a broad range of objectives in counseling and guidance. Emphasis on criteria, techniques and research procedures necessary to evaluate counselor programs.
- 662. **PHYSICAL DIMENSIONS OF COUNSELING (4).** Pr., CCP 621 or 622. Implementation of physical fitness skills to raise the energy level of the helper; use of physical fitness and challenge response activities as a tool in the helping relationship. (This course is also offered as HPR 662.)
- 695. **PRACTICUM (1-15).** Experiences relating theory and practice, usually simultaneously.
- 699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Curriculum and Teaching (CT)

Professors Weaver, Head, Alley, Cadenhead, Easterday, Graves, and Ley
Associate Professors Allen, Kaplan, Johnson, Melvin, Noland, Rice,
Rowsey, Silvern, Taylor, Wilson, Wright, von Eschenbach, and Williamson
Assistant Professors Baird, Jensen, Williams, and Worden

Areas of Specialization: Early Childhood Education, Elementary Education, English Language Arts Education, Foreign Language Education, Journalism Education, Mathematics Education, Music Education, Reading Education, Science Education, Social Science Education.

EARLY CHILDHOOD EDUCATION (CTC)

- 102. **ORIENTATION (1).** Helps new students and transfers from other curricula to understand teacher education and teaching as a profession.
- 315. **LANGUAGE DEVELOPMENT: IMPLICATIONS FOR THE CHILDHOOD EDUCATOR (4).** Applications of language development theories to teaching children. Emphasis on effects theories have on curriculum and teaching.
- 320. **CURRICULUM FOR EARLY CHILDHOOD EDUCATION I (10).** LEC. 8, LAB. 6. Pr., admission to Teacher Education, junior standing. Language Arts and Social Science curricula appropriate for children ages four through eight. Laboratory experiences are required.
- 355. **SURVEY OF EARLY CHILDHOOD EDUCATION (3).** Survey of the teaching profession, the nature of programmatic variation at the early childhood level.
- 420. **CURRICULUM FOR EARLY CHILDHOOD EDUCATION II (10).** LEC. 8, LAB. 6. Pr., admission to Teacher Education, junior standing. Mathematics and natural science curricula appropriate for children ages four through eight. Laboratory experiences are required.
- 425. **PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, admission to Teacher Education prior to Internship, appropriate professional courses. Provides supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled discussion periods designed to provide positive evaluation and analysis of the intern experience.
- 446. **DIRECTED INDEPENDENT STUDY (1-10).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
- 450. **SPECIAL TOPICS (1-5).** Students and professors pursue cooperatively selected concepts and theoretical formulations, normally in small groups.
- 488. **READINGS FOR HONORS (1-10).** Individual readings program for students in the Honors Program. Open only to students in the Honors Program with the consent of the Honors adviser.
- 489. **HONORS THESIS (3-6).** Pr., senior standing in the Honors Program. May be repeated for a maximum of 6 hours credit. The student thesis is finalized in this course. Open only to students in the Honors Program with the consent of the Honors adviser.
- 495. **PRACTICUM (1-10).** Provides experiences closely relating theory and practice, usually carried on simultaneously.

GRADUATE

601. **LOGO AND CURRICULUM (4).** Pr., graduate level curriculum course or COI. Conceptual constructs of the Logo programming language as they apply to the development and implementation of primary, elementary, and secondary curriculum.
620. **EARLY CHILDHOOD EDUCATION PERSPECTIVE (4-5).** Development of early childhood education as an area in non-school and school settings.
621. **ANALYSIS OF EARLY CHILDHOOD EDUCATION PROGRAMS (4-5).** Analysis of model programs with distinctive philosophies, theoretical frameworks, goals, materials, and practices.
624. **RESEARCH IN EARLY CHILDHOOD EDUCATION (4-5).** Review, analysis, and interpretation of research in areas of early childhood education.
625. **INTERNSHIP (5-15).** Supervised on-the-job experiences in a school, college, or other appropriate setting, accompanied by regularly scheduled, on-campus discussion periods designed to provide positive evaluation and analysis of this experience.
626. **PLAY AND EARLY CHILDHOOD EDUCATION (4).** Examination of children's play from a constructivist, theoretical perspective and translation of theory into early childhood educational practice.
627. **CHILDREN'S NATURAL DEVELOPMENTAL LEARNING (4).** Examination of how children learn from a constructivist, theoretical perspective and translation of that theoretical perspective into practice in early childhood education.
628. **THEMATIC CURRICULUM IN EARLY CHILDHOOD EDUCATION (4).** Examination of alternatives in the organization of curriculum for young children based on recent research and constructivist theory.
646. **DIRECTED INDEPENDENT STUDY (1-6).** Special study in which the student's learning efforts are guided toward desired objectives, including evaluation by professor and student of work accomplished at regular intervals.
650. **SEMINAR IN EARLY CHILDHOOD EDUCATION (3-10).** May be repeated for credit not to exceed 10 hours.
651. **RESEARCH STUDIES IN EARLY CHILDHOOD EDUCATION (4-5).** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
652. **CURRICULUM AND TEACHING IN EARLY CHILDHOOD EDUCATION (4-5).** Teaching practices and reappraisal of selected experiences and content for curriculum improvement.
653. **ORGANIZATION OF PROGRAMS IN EARLY CHILDHOOD EDUCATION (4-5).** Program organization and development of basic and supplementary materials for guiding teachers and school systems in the continuous improvement of curriculum and teaching practices.
654. **EVALUATION OF PROGRAMS IN EARLY CHILDHOOD EDUCATION (4-5).** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human and material resources and the coordination of areas of specialization.
672. **DESIGNING EARLY CHILDHOOD EDUCATION CURRICULA (4-5).** Pr., CTC 621, CTC 652, and one additional departmental curriculum and teaching course. Application of early childhood history, philosophy, and program analysis to the design of early childhood curriculum.
695. **PRACTICUM (1-15).** Provides advanced students with experiences closely relating theory and practice, usually carried on simultaneously.
699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
725. **INTERNSHIP FOR DOCTORAL AND SPECIALIST STUDENTS (5-15).**
746. **ADVANCED GRADUATE INDEPENDENT STUDY (1-6).**
750. **ADVANCED GRADUATE SEMINAR (1-10).**
795. **PRACTICUM FOR DOCTORAL AND SPECIALIST STUDENTS (1-15).**
798. **FIELD PROJECT. (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION.** (Student must be enrolled for a minimum of 1 quarter hour of credit from the time the program of studies is filed with the Graduate School until the final examination.) -

ELEMENTARY EDUCATION (CTE)

Programs in Elementary Education lead to certification in grades 1-6. Endorsements for Middle School certification, grades 4-8, in certain specific teaching fields are also available.

102. **ORIENTATION (1).** Helps new students and transfers from other curricula to understand teacher education and teaching as a profession.
302. **CURRICULUM I, LANGUAGE ARTS (5).** LEC. 4, LAB. 3. Pr., admission to Teacher Education, junior standing.
303. **CURRICULUM I, SOCIAL SCIENCE (5).** LEC. 4, LAB. 3. Pr., admission to Teacher Education, junior standing.
402. **CURRICULUM II, MATHEMATICS (5).** LEC. 4, LAB. 3. Pr., junior standing.
403. **CURRICULUM II, NATURAL SCIENCE (5).** LEC. 4, LAB. 3. Pr., junior standing.
425. **PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, admission to Teacher Education prior to Internship, appropriate professional courses. Provides supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled discussion periods designed to provide positive evaluation and analysis of the intern experience.
446. **DIRECTED INDEPENDENT STUDY (1-10).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.

- 450. **SPECIAL TOPICS (1-5).** Seniors and professors pursue cooperatively selected concepts and theoretical formulations.
- 451. **ANALYSIS OF ELEMENTARY INSTRUCTIONAL STRATEGIES (3).** LEC. 4, LAB. 2. Pr., professional Internship. Patterns of elementary curriculum and organization for instruction, including the analysis of previous and current laboratory experiences in education. Attention given to implementation of systems approach in student's area of specialization.
- 488. **READINGS FOR HONORS (1-10).** Individual readings program for students in the Honors Program. Open only to students in the Honors Program with the consent of the Honors adviser.
- 489. **HONORS THESIS (3-6).** Pr., senior standing in the Honors Program. May be repeated for a maximum of 6 hours credit. The student thesis is finalized in this course. Open only to students in the Honors Program with the consent of the Honors adviser.
- 495. **PRACTICUM (1-10).** Provides experiences closely relating theory and practice, usually carried on simultaneously.

GRADUATE

- 600. **FIRST AND SECOND LANGUAGE ACQUISITION OF THE BILINGUAL CHILD (4-5).** Language acquisition theories; second language learning; characteristics of the speaker's native language; and psychological and linguistic differences between English and the native language. Review, use, and analysis of language assessment instruments in bilingual education.
- 625. **INTERNSHIP (5-15).** Provides advanced students with supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled, on-campus discussion periods designed to provide positive evaluation and analysis of the intern experience.
- 646. **DIRECTED INDEPENDENT STUDY (1-6).** Special study in which the student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
- 649. **THE ELEMENTARY SCHOOL PROGRAM (4-5).** Major curriculum areas and teaching practices in the modern elementary school. Attention is given to implications of research and theory for the total elementary school program.
- 650. **SEMINAR IN AREAS OF SPECIALIZATION (3-10).** May be repeated for credit not to exceed 10 hours. Provides an opportunity for advanced graduate students and professors to pursue cooperatively selected concepts and theoretical formulations.

Each of the following courses, 651, 652, 653, and 654 applies to the following areas of the elementary school program: (G) Language Arts, (H) Mathematics, (K) Science, (L) Social Science, and (S) Bilingual Education.

- 651. **RESEARCH STUDIES IN EDUCATION IN AREA OF SPECIALIZATION (4-5).** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
- 652. **CURRICULUM AND TEACHING IN AREA OF SPECIALIZATION (5).** Teaching practices and reappraisal of selecting experiences and content for curriculum improvement.
- 653. **ORGANIZATION OF PROGRAM IN AREA OF SPECIALIZATION (4-5).** Program, organization, and development of basic and supplementary materials for guiding teachers, faculties, and school systems in the continuous improvement of curriculum and teaching practices.
- 654. **EVALUATION OF PROGRAM IN AREA OF SPECIALIZATION (4-5).** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human and material resources and the coordination of areas of specialization.

Prerequisites for the 651, 652, 653, and 654 courses are 18 hours of appropriate subject matter and 36 hours of psychology and professional education.

- 657. **INDIVIDUALIZING INSTRUCTION IN ELEMENTARY SCHOOLS (4-5).** Analysis of programs for individualizing instruction. Emphasis will be on design, implementation, and management.
- 695. **PRACTICUM (1-15).** Provides advanced students with experiences closely relating theory and practice, usually carried on simultaneously.
- 699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 725. **INTERNSHIP FOR DOCTORAL AND SPECIALIST STUDENTS (5-15).**
- 746. **ADVANCED GRADUATE INDEPENDENT STUDY (1-6).**
- 750. **ADVANCED GRADUATE SEMINAR (1-10).**
- 795. **PRACTICUM FOR DOCTORAL AND SPECIALIST STUDENTS (1-15).**
- 798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

ENGLISH LANGUAGE ARTS EDUCATION

(See Secondary Education (CTS), and Middle School Education (CTD), below).

FOREIGN LANGUAGE EDUCATION

(See Secondary Education (CTS), and Middle School Education (CTD), below).

JOURNALISM EDUCATION

(See Secondary Education (CTS), below).

MATHEMATICS EDUCATION

(See Secondary Education (CTS), and Middle School Education (CTD), below).

MIDDLE SCHOOL EDUCATION (CTD)

- 401. **TEACHING MATHEMATICS: MIDDLE SCHOOL (4).** LEC. 3, LAB. 2. Specific teaching strategies for a comprehensive middle school mathematics program.
- 419. **THE MIDDLE SCHOOL (5).** LEC. 4, LAB. 3. Pr., FED 300, admission to Teacher Education, junior standing. Historical perspective and rationale for the development of the middle school program. Analysis of middle school organization and selected programs. Laboratory experiences are required.
- 425. **PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, admission to Teacher Education prior to Internship, appropriate professional courses. Supervised teaching in a school, accompanied by scheduled discussions designed to analyze and evaluate the intern's experience.
- 446. **DIRECTED INDEPENDENT STUDY (1-10).** Planned individual inquiry, including evaluation by professor and student at regular intervals.
- 450. **SPECIAL TOPICS (1-5).** Cooperative pursuit of selected concepts and theories, normally in small groups.
- 495. **PRACTICUM (1-10).** Experiences designed to allow individual students to relate theory and practice.

MUSIC EDUCATION (CTM)

Students majoring in music education must demonstrate functional keyboard skills appropriate to their chosen area of concentration. The keyboard proficiency examination is taken prior to enrollment in any CTM course. Additional degree requirements are available from the Dean of Education.

- 102. **ORIENTATION FOR MUSIC EDUCATION STUDENTS (1).** Helps students to understand teacher education and teaching as a profession as well as become acquainted with the preparation program in music education.
- 304. **MUSIC AND RELATED ARTS (3-5).** Pr., MU 371 or equivalent. Musical, rhythmic, and artistic activity program in the context of laboratory experiences with children.
- 394. **TEACHING ELEMENTARY INSTRUMENTAL MUSIC (3).** LEC. 2, LAB. 2. Pr., 6 hours of class instruments. Methodology, materials, and organization for beginning instrumental music programs; includes laboratory experiences with children.
- 396. **EARLY CHILDHOOD AND ELEMENTARY MUSIC PROGRAMS (3).** LEC. 2, LAB. 2. Pr., CTM 304 or COI. Methodology, materials, and activities for music programs in grades N-6; includes laboratory experiences with children.
- 425. **PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, admission to Teacher Education prior to Internship, appropriate professional courses. Provides supervised, on-the-job experiences in school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled discussion periods designed to provide positive evaluation and analysis of the intern experience.
- 446. **DIRECTED INDEPENDENT STUDY (1-10).** Planned individual inquiry including evaluation by professor and student at regular intervals.
- 450. **SPECIAL TOPICS IN MUSIC EDUCATION (1-5).** Cooperative pursuit of selected concepts and theories. May be repeated not to exceed 6 hours.
- 488. **READINGS FOR HONORS (1-10).** Individual readings program for students in the Honors Program. Open only to students in the Honors Program with the consent of the Honors adviser.
- 489. **HONORS THESIS (3-6).** Pr., senior standing in the Honors Program. May be repeated for a maximum of 6 hours credit. The student thesis is finalized in this course. Open only to students in the Honors Program with the consent of the Honors adviser.
- 495. **PRACTICUM (1-10).** Experiences designed to allow individual students to relate theory to practice.

ADVANCED UNDERGRADUATE AND GRADUATE

- 593. **MATERIALS AND ORGANIZATION OF SCHOOL ORCHESTRAS (3).** Pr., COI. Administrative procedures, instructional strategies, and materials for intermediate and advanced school orchestra programs.
- 594. **MATERIALS AND ORGANIZATION OF SCHOOL BANDS (3).** Pr., COI. Administrative procedures, instructional strategies, and materials for intermediate and advanced school band programs.
- 595. **MATERIALS AND ORGANIZATION OF SCHOOL CHOIRS (3).** Pr., COI. Administrative procedures, instructional strategies, and materials for school choral programs.
- 596. **CURRENT TRENDS IN EARLY CHILDHOOD AND ELEMENTARY MUSIC (4).** Pr., CTM 396 or COI. Advanced study and evaluation of skills, techniques, materials, theories, and trends in music teaching.
- 597. **MATERIALS AND ORGANIZATION OF GENERAL MUSIC PROGRAMS (4).** Pr., CTM 396 or COI. Scope and sequence of school general music programs with emphasis on materials and methodologies for post-elementary programs.

GRADUATE

611. **KODALY CONCEPT IN AMERICAN MUSIC EDUCATION (4-5).** Pr., CTM 596 or COI. Theory underlying the Kodaly concept of music education and implications for adaptation to American schools and music literature, with applications to a classroom situation through laboratory experiences.
625. **INTERNSHIP (5-15).** Provides advanced students with supervised, on the job experiences in a school or college or other appropriate setting. These experiences will be accompanied by regularly scheduled on-campus discussion periods designed to provide positive evaluation and analysis of the intern experience.
646. **DIRECTED INDEPENDENT STUDY (1-6).** Special study in which the student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student at regular intervals.
650. **SEMINAR IN MUSIC EDUCATION (3-10).** May be repeated for credit not to exceed 10 hours. Provides an opportunity for advanced graduate students and professors to pursue cooperatively selected concepts and theoretical formulations.
651. **RESEARCH STUDIES IN MUSIC EDUCATION (4-5).** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
652. **CURRICULUM AND TEACHING IN MUSIC EDUCATION (4-5).** Teaching practices and reappraisal of selecting experiences and content for curriculum improvement.
653. **ORGANIZATION OF PROGRAM IN MUSIC EDUCATION (4-5).** Program organization, and development of basic and supplementary materials for guiding teachers, faculties, and school systems in the continuous improvement of curriculum and teaching practices.
654. **EVALUATION OF PROGRAM IN MUSIC EDUCATION (4-5).** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human material resources and the coordination of areas of specialization.

Prerequisites for the 651, 652, 653, and 654 courses are 18 hours of appropriate subject matter and 36 hours of psychology and professional education.

695. **PRACTICUM. (1-15).** Students get experiences closely relating theory and practice, usually carried on simultaneously.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

READING EDUCATION (CTR)

201. **COLLEGE READING AND STUDY SKILLS (3).** LEC. 2, LAB. 2. General elective. Comprehension skills for college students, including classroom performance skills, reading efficiency techniques, vocabulary development, and study skills. Students will utilize own content area textbooks.
370. **FUNDAMENTALS OF READING INSTRUCTION I (5).** LEC. 3, LAB. 4. Pr., FED 300 and junior standing. Develops competencies in the teaching of reading. Introduces student to the basic aspects of teaching reading. Fundamental constructs considered are readiness, informal diagnosis, reading skills, planning, approaches, enjoyment of reading, learners with special needs.
371. **FUNDAMENTALS OF READING INSTRUCTION II (5).** LEC. 3, LAB. 4. Pr., CTR 370 or COI. Builds on CTR 370 in developing competencies in the teaching of reading. Topics include word recognition, comprehension, and study skills (teaching level); the basal reader and individualized approaches; lesson planning; diagnostic teaching of reading. Commercial materials are evaluated and teacher-made materials are produced. Laboratory experiences with children.
446. **DIRECTED INDEPENDENT STUDY (1-10).** Planned individual inquiry, including evaluation by professor and student at regular intervals.
450. **SPECIAL TOPICS (1-5).** Seniors and professors pursue cooperatively selected concepts and theoretical formulations, normally in small groups.

ADVANCED UNDERGRADUATE AND MASTER'S LEVEL

570. **READING IN THE CONTENT AREAS OF THE ELEMENTARY SCHOOL (5).** LEC. 3, LAB. 4. Pr., CTR 370 and junior standing. Develops competencies in teaching functional reading in the elementary school. Directed reading activities, specialized skills, and study skills stressed.
571. **READING IN THE CONTENT AREAS OF THE SECONDARY SCHOOL (5).** Reading problems in content areas of the secondary school and special methods of helping students overcome these problems.
576. **THE READING OF ADOLESCENTS (5).** Pr., CTR 571 or COI. Use of adolescent and popular adult literature in the secondary school reading program. Motivation of the reluctant reader; criteria for evaluating reading materials; and self-selection/self-pacing reading programs in the English or reading classroom.

GRADUATE

625. **INTERNSHIP (5-15).** Supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences accompanied by regularly scheduled, on-campus discussion periods and evaluation and analysis of the intern experience.
630. **THE READING PROCESS (4-5).** Pr., FED 617 or equivalent. Prominent theories concerning mature reading behavior as reflected in current instructional practices.

- 640. DIAGNOSTIC AND CORRECTIVE TEACHING OF READING (4-5).** Need for diagnostic and corrective procedures in the classroom. Procedures in conducting a diagnosis, including interpretation of results. Nature and causes of reading disability: corrective and remedial procedures, including materials, are examined. Opportunities for diagnosis and corrective/remedial teaching.
- 641. DIAGNOSTIC PROCEDURES IN READING (4-5).** Pr., CTR 661 or COI. Administration, scoring and interpretation of specific reading tests both diagnostic and achievement to determine causes of reading disabilities. Formal and informal evaluation procedures for regular and remedial classrooms. Screening tests for contributing factors to reading disability. Analysis of test information and the implications for correction of reading difficulties.
- 642. REMEDIAL PROCEDURES IN READING (4-5). LEC. 4, LAB. 4.** Pr., CTR 641 or COI. Individual and group techniques for correcting deficiencies and practice in continuing evaluation of reading difficulties. Practice in using special reading equipment and materials with children having reading problems.
- 646. DIRECTED INDEPENDENT STUDY (1-6).** Special study in which the student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student at regular intervals.
- 650. SEMINAR IN READING EDUCATION (3-10).** May be repeated for credit not to exceed 10 hours. Provides an opportunity for advanced graduate students and professors to pursue cooperatively selected concepts and theoretical formulations.
- 651. RESEARCH STUDIES IN READING (4-5).** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
- 652. CURRICULUM AND TEACHING IN READING (4-5).** Teaching practices and reappraisal of selecting experiences and content for curriculum improvement.
- 653. ORGANIZATION OF PROGRAM IN READING (4-5).** Program, organization, and development of basic and supplementary materials for guiding teachers, faculties, and school systems in the continuous improvement of curriculum and teaching practices.
- 654. EVALUATION OF PROGRAM IN READING (4-5).** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human and material resources and the coordination of areas of specialization.
- 656. DIRECTED INDIVIDUAL STUDY IN READING DIAGNOSIS AND READING REMEDIATION (5).** Pr., CTR 640, 642, or COI. Clinical experiences in diagnosing problems in reading and related areas. Also clinical experiences in the remediation of reading problems.
- 661. CURRENT THEORY, PRACTICE AND TECHNOLOGY IN READING INSTRUCTION. (4).** Pr., CTR 652 or COI. Current theory, practices, and the impact of technology upon classroom management; cognition, affective and psychomotor development as related to reading.
- 674. PROBLEMS IN IMPROVEMENT OF READING AT THE ELEMENTARY SCHOOL LEVEL (1-5).** Pr., teaching experience or COI. An examination of problem areas of effective reading instruction in grades one through nine. Emphasis on phonetic word attack skills, comprehension, vocabulary building, and the use of supplementary materials in the reading program.
- 675. PROBLEMS IN IMPROVEMENT OF READING AT THE SECONDARY SCHOOL LEVEL (1-5).** Pr., junior standing or teaching experience or COI. Problem areas of effective reading instruction in developmental reading in grades seven through twelve. Emphasis on techniques and materials for the teaching of comprehension, study skills, vocabulary and other related areas in the reading program and in the content areas of the secondary school.
- 695. PRACTICUM (1-15).** Provides advanced students with experiences closely relating theory and practice, usually carried on simultaneously.
- 699. RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 725. INTERNSHIP FOR DOCTORAL AND SPECIALIST STUDENTS (5-15).**
- 746. ADVANCED GRADUATE INDEPENDENT STUDY (1-6).**
- 750. ADVANCED GRADUATE SEMINAR (1-10).**
- 795. PRACTICUM FOR DOCTORAL AND SPECIALIST STUDENTS (1-15).**
- 798. FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 799. RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

SCIENCE EDUCATION

(See Secondary Education (CTS), below and Middle School Education (CTD).)

SECONDARY EDUCATION (CTS)

Undergraduate students must select two teaching majors unless they select the composite majors offered in English Language Arts, Mathematics, General Science, and Social Studies. These programs lead to certification at the high school level, grades 7-12. Endorsements for certification at the Middle School level, grades 4-8 are also available, as is specific certification at only the Middle School level.

For some courses, there are special sections denoted by a letter code corresponding to the areas of specialization. These areas are: (D) Foreign Language, (G) English, (H) Mathematics, (K) Science, (L) Social Science, and (U) Journalism.

- 102. ORIENTATION (1).** Helps new students and transfers from other curricula to understand teacher education and teaching as a profession.
- 110-111-112. DEVELOPMENTAL STUDIES 1, 2, 3 (2).** (CREDIT NOT COUNTED TOWARD GRADUATION.) Designed to develop skills conducive to successful college study. Emphasis on reading skills and their relation to other language arts. Attention is given to study skills, communication skills for formal and informal use, and cultural aspects of communication.
- 201. EDUCATION (2).** Designed to help prospective teachers in the guidance of students. (A) Art Expression, (J) Music Experiences, (Q) Materials of Instruction.
- 201L. EDUCATION (1).** LAB. 2. Laboratory will be taken concurrently with the corresponding lecture course or independent of the lecture.
- 204. FUNDAMENTALS OF COMPUTER PROGRAMMING. (3).** An introduction to microcomputers and computer programming with emphasis on solution of mathematical problems using BASIC. String variables and introduction to graphics are included.
- 205. PROBLEMS IN COMMUNICATION (3).** LEC. 2, LAB. 2. Language usually taught in the secondary English classrooms with special attention to questioning techniques, student/teacher interaction, standard/non-standard English, semantics, and oral/written English.
- 375. SCIENCE FICTION IN THE SECONDARY SCHOOL PROGRAM (5).** Selected works of science fiction with emphasis on the use of this genre to augment the teaching in the content areas of the secondary school curriculum.
- 400. APPLIED LINGUISTICS FOR FOREIGN LANGUAGE TEACHERS (3).** The application of linguistics in the teaching of foreign languages.
- 402. MATHEMATICS PROGRAM AND TEACHING I (3).** LEC. 2, LAB. 2. Emphases are diagnostic and prescriptive procedures, theories of learning applied to managing and evaluating mathematics programs.
- 403. MATHEMATICS PROGRAM AND TEACHING II (3).** LEC. 2, LAB. 2. Emphases are historical bases for school mathematics programs, planning, procedures, instructional strategies, and teaching of problem solving.
- 404. TEACHING MATHEMATICS: APPLICATION AND TECHNOLOGY (3).** LEC. 2, LAB. 2. Uses of calculators and computers in school mathematics and the teaching of applications in mathematics.

Each of the following two courses, CTS 405 and 410 is sectioned as follows: (D) Foreign Language, (K) Science, (L) Social Science, and (U) Journalism.

- 405.* TEACHING IN SECONDARY SCHOOL (3).** LEC. 2, LAB. 2. Pr., FED 350, or COI.
- 410.* PROGRAM IN SECONDARY SCHOOL (3).** LEC. 2, LAB. 2. Pr., FED 350, or COI.
- 411. TEACHING ENGLISH: LANGUAGE AND LINGUISTICS (3).** LEC. 2, LAB. 2. Pr., FED 350, or COI. Specific teaching strategies in language and linguistics.
- 412. TEACHING ENGLISH: LITERATURE (3).** LEC. 2, LAB. 2. Pr., FED 350, or COI. Specific teaching strategies in literature.
- 413. TEACHING ENGLISH: RHETORIC AND COMPOSITION (3).** LEC. 2, LAB. 2. Pr., FED 350, or COI. Specific teaching strategies in rhetoric and composition.
- 415. CURRENT TRENDS AND PRACTICES IN AREAS OF SPECIALIZATION (3).** LEC. 2, LAB. 2. Pr., FED 350, or COI. The study and application of contemporary curriculum and instructional trends and practices within the areas of specialization of the secondary school program.
- 420. THE SECONDARY SCHOOL (5).** Current thinking about the organization and purpose of secondary schools.
- 421. SOCIAL SCIENCE CONCEPTS AND METHODS (5).** Pr., 25 hours in social sciences. The structure, key concepts, and methods of investigation of the social sciences. Emphasis is placed on those social sciences taught in secondary schools.
- 425. PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, admission to Teacher Education prior to Internship, appropriate professional courses. Supervised teaching in a school, accompanied by scheduled discussions designed to analyze and evaluate the intern's experience.
- 446. DIRECTED INDEPENDENT STUDY (1-10).** Planned individual inquiry, including evaluation by professor and student at regular intervals.
- 450. SPECIAL TOPICS (1-5).** Cooperative pursuit of selected concepts and theories, normally in small groups.
- 488. READINGS FOR HONORS (1-10).** Individual readings program for student in the Honors Program. Open only to students in the Honors Program with the consent of the Honors adviser.
- 489. HONORS THESIS (3-6).** Pr., senior standing in the Honors Program. May be repeated for a maximum of 6 hours credit. The student thesis is finalized in this course. Open only to students in the Honors Program with the consent of the Honors adviser.
- 495. PRACTICUM (1-10).** Experiences designed to allow individual students to relate theory and practice.

ADVANCED UNDERGRADUATE AND GRADUATE

- 501. LANGUAGE STUDY FOR TEACHERS (5).** Linguistics in the school curriculum; the child's acquisition of syntax, theories of teaching usage, dialectology, lexicography, and grammar; English as a second language, non-verbal communication in the classroom; research studies in language and linguistics and their applications to classroom teaching.

502. **RHETORIC AND COMPOSITION FOR TEACHERS (5).** Topics and current trends in teaching rhetoric and composition; Classical and new rhetorics; theories of paragraph analysis; behavioral approaches to composition; pupil motivation and the composing process; current research; evaluation.

GRADUATE

625. **INTERNSHIP (5-15).** Supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences accompanied by regularly scheduled, on-campus discussion periods and evaluation and analysis of the intern experience.
- 640-641. **ADVANCED STUDY OF HIGH SCHOOL GENERAL SCIENCE (4-5).** Intensive study of selected topics from the area of the high school general science program.
646. **DIRECTED INDEPENDENT STUDY (1-6).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
649. **THE SECONDARY SCHOOL PROGRAM (4-5).** For advanced graduate students. Major curriculum areas and teaching practices in the modern secondary school. Attention given to implications of research and theory for the total secondary school program.
650. **SEMINAR (3-10).** May be repeated not to exceed 10 hours.
651. **RESEARCH STUDIES IN EDUCATION IN AREA OF SPECIALIZATION (4-5).** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
652. **CURRICULUM AND TEACHING IN AREA OF SPECIALIZATION (4-5).** Teaching practices and reappraisal of selecting experiences and content for curriculum improvement.
653. **ORGANIZATION OF PROGRAM IN AREA OF SPECIALIZATION (4-5).** Program, organization, and development of basic and supplementary materials for guiding teachers, faculties, and school systems in the continuous improvement of curriculum and teaching practices.
654. **EVALUATION OF PROGRAM IN AREA OF SPECIALIZATION (4-5).** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human and material resources and the coordination of areas of specialization.
695. **PRACTICUM (1-15).** Students get experiences closely relating theory and practice, usually carried on simultaneously.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
725. **INTERNSHIP FOR DOCTORAL AND SPECIALIST STUDENTS (5-15).**
746. **ADVANCED GRADUATE INDEPENDENT STUDY (1-6).**
750. **ADVANCED GRADUATE SEMINAR (1-10).**
795. **PRACTICUM FOR DOCTORAL AND SPECIALIST STUDENTS (1-15).**
798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

*410L is a prerequisite for 405L.

SOCIAL SCIENCE EDUCATION

(See Secondary Education (CTS), and Middle School Education (CTD).)

Economics (EC)

Professors Chastain, Ekelund, Hebert, Holcombe, Jones, Kaserman,
Long, Street, Whitten, and Yeager
Associate Professors Barnett, Garrison, Jackson, *Acting Head*, and Saba
Assistant Professors Ault, Beard, Beil, Caudill, and Thompson
Instructors Gropper, Mangel, Montgomery, and Thornton

Effective Fall Quarter 1990, a 2.0 GPA will be required for enrollment in any Business course at the 300-level and above. This rule will apply to both Business and non-Business students.

200. **ECONOMICS I (5).** Pr., sophomore standing. Economic principles with emphasis upon the macroeconomic aspects of the national economy. (Credit not allowed for this course and AEC 200.)
202. **ECONOMICS II (5).** Pr., sophomore standing. Economic principles with emphasis upon microeconomic aspects of the economy. (Credit not allowed for this course and AEC 202.)
206. **SOCIO-ECONOMIC FOUNDATIONS OF CONTEMPORARY AMERICA (3).** The social and economic developments which promote an understanding of present day American society. (Credit not allowed for this course and EC 202.)
301. **ECONOMIC PRINCIPLES AND BUSINESS POLICY (5).** An accelerated course in economic principles combining key topics from EC 200 and 202. Offered for business minors **only**. (Credit not allowed for this course and EC 200 or 202. This course will not count as credit for any economics major).

340. **ENVIRONMENTAL ECONOMICS** (5). Pr., EC 202 or COI. Economic analysis applied to topical environmental issues such as pollution, preservation vs. development, economic growth, and population.
350. **LABOR ECONOMICS** (5). Pr., EC 202, junior standing. A theoretical and institutional examination of the labor market, including wage theories, unionism, the economics of collective bargaining and income security.
360. **MONEY AND BANKING** (5). Pr., EC 200 or AEC 200, junior standing. Money, credit and banking including consideration of monetary systems, foreign exchange and commercial banking with relation to the Federal Reserve System.
400. **STUDENT INTERNSHIP PROGRAM** (1-10). Pr., junior standing and selection by faculty committee.
433. **LAW AND ECONOMICS** (5). Pr., EC 202 or COI, and junior standing. A description of the many substantive areas in which law has an economic foundation and an analysis of the ways in which law affects economic relations.
470. **HONORS THESIS** (1-6). Pr., open only to persons in the University Honors Program and with consent of the student's Honors Adviser.
471. **GOVERNMENT, BUSINESS, AND SOCIETY** (5). Pr., EC 202 and junior standing. Economic role of government in a free enterprise economy. Emphasis on the application of microeconomic theory to public policy issues.
490. **SPECIAL PROBLEMS** (1-10). Pr., COI, junior standing. May be repeated. Investigation and research into economic problems of special interest to the student and instructor.

ADVANCED UNDERGRADUATE AND GRADUATE

551. **INTERMEDIATE MICROECONOMICS** (5). Pr., EC 202, and junior standing. The theory of pricing under various market conditions and distribution of income among the factors of production.
552. **COMPARATIVE ECONOMIC SYSTEMS** (5). Pr., EC 202 and junior standing. An analysis of the rival economic doctrines of Capitalism, Socialism, and Communism.
553. **ECONOMICS OF GROWTH AND DEVELOPMENT (DESARROLLO ECONOMICO)** (5). Pr., EC 200 and junior standing, taught in English or Spanish. Concepts, principles and problems of economic growth and development with consideration of appropriate policies for both underdeveloped and advanced economies.
554. **HISTORY OF ECONOMIC THOUGHT** (5). Pr., EC 202 and junior standing. The development of economic ideas, principles, and systems of analysis from early times to the present.
555. **INDUSTRIAL ORGANIZATION** (5). Pr., EC 202 and junior standing. The relationship of market structure to the pricing behavior of business and industry. Selected topics: regulation, research and development, and technological change.
556. **INTERMEDIATE MACROECONOMICS** (5). Pr., EC 202 and junior standing. The measurement of national output, income and employment theory, general equilibrium theory, and theories of interest, investment, and consumption.
557. **ECONOMIC HISTORY OF EUROPE** (5). Pr., EC 200 and junior standing. An analysis of the development of the European economy and the resulting impact on the United States and the world.
558. **ECONOMIC HISTORY OF THE UNITED STATES** (5). Pr., junior standing. The evolution of the American economy from European origins to the present.
559. **REGIONAL ECONOMIC DEVELOPMENT** (5). Pr., EC 200 and junior standing. Analytical discussion of the principles associated with the regional development of a national economy. Emphasis is on the problems of lagging regions and on the experience of the United States.
562. **INTERMEDIATE MONETARY THEORY AND POLICY** (5). Pr., EC 360 and junior standing. Attention given to theoretical and empirical studies. Readings from original sources required.
565. **PUBLIC FINANCE** (5). Pr., EC 202 and junior standing. An examination of the economic rationale of the public sector; supply and demand of public goods. Principles of efficient and equitable taxation and government spending.
568. **BUSINESS HISTORY OF THE UNITED STATES** (5). Pr., junior standing. The origins and developmental patterns of American business with an emphasis on the role of the business community in the economic and political evolution of the United States.
571. **INTERNATIONAL ECONOMICS (ECONOMIE INTERNATIONALE)** (5). EC 200, 202, and junior standing, taught in English or French. An examination of the pure theory and monetary aspects of international trade.
580. **BUSINESS AND ECONOMIC FORECASTING** (5). Pr., EC 200, 202 and MN 274 or COI, and junior standing. Forecasting, with emphasis on the interpretation of macroeconomic forecasting methods and the development of competency in forecasting at the level of the firm.
585. **MATHEMATICAL ECONOMICS** (5). MH 161, EC 551, and 556, and junior standing. An introduction to mathematical methods in economics. Fundamental propositions of micro and macroeconomic theory are derived mathematically.

GRADUATE

601. **FOUNDATIONS OF ECONOMICS** (3). Pr., for non-business students, consent of Director of the MBA Program, College of Business. An accelerated course combining both micro- and macroeconomics and implications for the manager.
602. **MICROECONOMICS I** (3). Pr., EC 551 and graduate standing. Principles of consumer behavior as they apply to economic choice in consumption, exchange, and labor supply.
603. **MICROECONOMICS II** (3). Pr., EC 551 and graduate standing. Principles of producer behavior as they apply to producer choice in production and factor utilization.
604. **MICROECONOMICS III** (3). Pr., EC 602, 603. General equilibrium analysis, welfare economics, and other special topics in microeconomic theory.

605. **MACROECONOMICS I (3).** Pr., EC 556 and graduate standing. Evaluation of fundamental theoretical and policy-oriented issues in macroeconomics, emphasizing post-Keynesian developments.
606. **MACROECONOMICS II (3).** Pr., EC 556 and graduate standing. Advanced monetary theory and the neoclassical synthesis.
607. **REGIONAL AND URBAN ECONOMICS (3).** Pr., COI and graduate standing. The economic forces involved in planning a dynamic urban region; the principles and applications of regional economic models.
608. **MACROECONOMICS III (3).** Pr., EC 605, EC 606. Advanced analysis of macrodynamics.
611. **ECONOMIC DEVELOPMENT (5).** Pr., COI, graduate standing. Conceptual and empirical analysis of economic development with emphasis on less developed countries and case studies of development problems.
614. **CAPITAL THEORY I (3).** Pr., EC 603 or COI. The theory of capital resource allocation in relation to saving, investment, interest rates, and production.
615. **CAPITAL THEORY II (3).** Pr., EC 614 or COI. Optimal investment decisions and interest rate determination under uncertainty.
616. **CAPITAL THEORY III (3).** Pr., EC 615 or COI. Further topics in capital theory, including selected asset pricing models.
623. **LABOR MARKET ANALYSIS (3).** Pr., EC 603, or COI. Advanced examination of consumer and producer behavior in labor markets, with special emphasis on recent empirical studies.
624. **HUMAN CAPITAL (3).** Pr., EC 623. Analysis of the causes and consequences of the choices made both by workers and firms to invest in labor.
625. **TOPICS IN LABOR ECONOMICS (3).** Pr., EC 623. Extensive treatment of selected topics in labor market analysis.
633. **ECONOMIC ANALYSIS OF THE LAW (3).** Pr., EC 551. Advanced analysis of the substantive areas in which law has an economic foundation and of the ways law affects economic relations.
634. **ECONOMICS OF REGULATION (3).** Pr., EC 551. An analysis of contemporary theories of economic regulation and examination of empirical evidence on effects of extra-market controls.
635. **TOPICS IN LAW AND REGULATION (3).** Pr., EC 633, EC 634, or COI. Advanced treatment of selected topics in law and regulation of economic activity.
636. **SEMINAR IN INDUSTRIAL ORGANIZATION (3).** Pr., EC 551. Advanced studies in the determinants of market structure and the effects of market structure on industrial activity.
640. **SEMINAR IN ENVIRONMENTAL ECONOMICS (3).** Pr., EC 551. Advanced analysis of pricing and allocation of renewable and non-renewable resources.
650. **ECONOMIC SEMINAR (1-10).** Pr., COI or graduate standing. Intensive study and analysis of selected economic problems.
651. **MACROECONOMICS FOR AN OPEN ECONOMY (5).** Pr., EC 601, MN 274 and, for non-business students, consent of Director of the MBA Program, College of Business. Macroeconomic theory and business forecasting of the aggregate economy.
655. **HISTORY OF ECONOMIC THOUGHT I (3).** Pr., EC 354 or COI. Analysis and study of classical contributions to economics, from early times through Karl Marx.
656. **MANAGERIAL ECONOMICS (5).** Pr., EC 601, MN 274 and, for non-business students, consent of Director of the MBA Program, College of Business. Microeconomic theories of the firm and of markets, with emphasis on their applications to current business issues.
657. **HISTORY OF ECONOMIC THOUGHT II (3).** Pr., EC 554, or COI. Analysis and study of neoclassical contributions to economics, circa 1870 to the present.
658. **SEMINAR IN THE ECONOMIC HISTORY OF THE U.S. (5).** Pr., EC 558, or COI. Recent developments in the field of knowledge constituting the economic history of the U.S.
659. **INTRODUCTION TO ECONOMETRICS (3).** Pr., MH 161 or equivalent, AEC 202 or EC 202 or equivalent, and MN 274 or equivalent; graduate standing. Formulation of elementary economic models using economic theory and mathematics with certain basic assumptions or axioms. Mathematical tools used in economic analysis (Cross listed as AEC 659.)
660. **ECONOMETRICS I (3).** Pr., EC 659 and graduate standing. Probability theory, distribution theory, univariate regression theory, and other problems in economics and statistics.
661. **ECONOMETRICS II (3).** Pr., EC 660. Multivariate regression theory, errors in variables, serial correlation, distributed lags and other problems in economics and statistics.
662. **SEMINAR IN MONEY AND BANKING (5).** Pr., EC 605, or COI. Goals, procedures and achievements in attaining monetary objectives at home and abroad. Special emphasis is given to macro-money models and effects of monetary policy on economic activity.
664. **EXTERNALITIES (3).** Pr., EC 604 or COI. Advanced analysis of pricing and allocation of economic goods when property rights are not well defined.
665. **SEMINAR IN PUBLIC FINANCE (3).** Pr., EC 565 or COI. Advanced microeconomic theory of the public sector.
666. **PUBLIC CHOICE (3).** Pr., EC 665, or COI. Advanced analysis of governmental and other not-for-profit sectors of the economy.
671. **INTERNATIONAL ECONOMICS AND FINANCE (5).** Pr., EC 571. Advanced foreign trade theory and balance of payments analysis, exchange rates, capital movements, financial institutions, and current problems.

- 690. **SPECIAL PROBLEMS (1-5).** Pr., graduate standing. Variable content in the economics area.
- 698. **ECONOMICS WORKSHOP (1).** Pr., Advanced graduate standing. Research and discussion of selected topics in economics.
- 699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
- 799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Educational Foundations, Leadership, and Technology (EFLT)

Professors Morgan, *Acting Head*, Blackburn, Burkhalter, G.M. Halpin,
G.W. Halpin, Lauderdale, and Trentham
Associate Professors Deaton, Greenshields, Ledford, Miller, Nist, Robison,
Scebra, Spencer, Williams, and Wright
Assistant Professors Bannon, Rucinski, Short, and Twale

COURSES IN EDUCATION LEADERSHIP (EDL)

Prerequisites and corequisites in the Department of Educational Leadership are experience in teaching or appropriate fields and employment or definite professional objectives leading to employment in administration or supervision.

- 401. **ORGANIZATION AND SUPPORT OF PUBLIC EDUCATION (2).** The organization, administration and financing of American public education.
- 601. **ORGANIZATION AND ADMINISTRATION OF PUBLIC EDUCATION (4-5).** For superintendents, principals, teachers and other educational leaders. Topics include purposes of organization and administration; organization and administration on federal, state, and local levels; financial support and accounting; operation of plant; school-community interaction and personnel administration.
- 603. **SCHOOL FINANCE AND BUSINESS ADMINISTRATION (4-5).** Relationships between and among educational finance, educational program, tax structures, foundation programs and internal accounting. Theories of public finance and economic principles relating to financial support of educational systems at the local, state and federal levels.
- 605. **EDUCATIONAL BUSINESS MANAGEMENT (4-5).** Procedures and practices in educational finance at the business or operational level. Attention to budgeting, accounting, purchasing, transportation, cost analysis, and management of human and material resources.
- 607. **EDUCATIONAL PLANT MAINTENANCE (4-5).** Relationship of educational plant maintenance and operation to educational program; procedures in educational plant maintenance and operation; safety factors; trends in modernization and new plant planning.
- 609. **PERSONNEL ADMINISTRATION (4-5).** Assists educational leaders with effective personnel administration. Analysis of personnel functions in educational administration.
- 612. **CONSTITUTIONAL, STATUTORY AND JUDICIAL FOUNDATIONS OF EDUCATION (4-5).** The constitutional and statutory provisions for education and an analysis of judicial decisions affecting education. Among topics are authority and responsibility of the teacher; rights, privileges and responsibilities of students, use of school property, taxation; curriculum, contracts and retirement provisions; contractual capacity and liability and transportation.
- 620. **FUNDAMENTALS OF LEADERSHIP AND SUPERVISION (4-5).** Introductory studies of the leadership process including such topics as the theoretical framework in which leadership takes place; the purposes, functions and processes of supervision and leadership; administrative and supervisory tasks and skills; and the methods of evaluating leadership and supervisory roles.
- 621. **ADVANCED STUDIES OF EDUCATIONAL LEADERSHIP AND SUPERVISION (4-5).** Pr., EDL 620, COI. Advanced study of current theories, concepts and principles of leadership and their in-depth application to educational roles. Emphasis is placed on the responsibility of the educational administrator for effective leadership in the school and community, and the responsibility for leadership in the continuous development and evaluation of staff competence and role performance.
- 623. **ADVANCED APPLICATION OF INSTRUCTIONAL SUPERVISION THEORY (4-5).** Pr., EDL 620. Selection and development of supervisory techniques for improvement of classroom instruction; emphasis on interaction analysis, observation techniques, microteaching, team supervision, management by objectives.
- 625. **INTERNSHIP (5-15).** Provides advanced students with supervised, on-the-job experiences in a school, college, or other appropriate setting. These will be accompanied by regularly scheduled, on-campus discussion periods designed to provide positive evaluation and analysis of the intern experience.
- 630. **PRINCIPLES OF CURRICULUM AND INSTRUCTION (4-5).** Pr., FED 647 or COI. Advanced course directed toward providing students the knowledge and skill necessary for deriving principles to guide the processes of planning, designing, and evaluating curriculums in training and educational settings.
- 631. **CURRICULUM THEORIES (4-5).** Pr., EDL 630 or COI. Advanced study of major curriculum theories with emphasis on those theories which have special significance in the analysis of contemporary educational practice.
- 632. **THEORIES FOR DESIGNING INSTRUCTION (4-5).** Pr., EDL 630, FED 618 or COI. Advanced study and application of theories relating to processes for design of instruction for various educational settings, with emphasis on the development of personalized process models. Attention is given to the relationship of learning and instructional theories.

634. **CURRICULUM AND INSTRUCTION DEVELOPMENT (4-5).** Pr., EDL 630, EDL 631, and EDL 632. Utilization of curriculum and instruction theories and research for the purpose of developing comprehensive educational programs or courses for various types and levels of organizations.
635. **CURRICULUM AND INSTRUCTION APPLICATION (4-5).** Pr., EDL 634 and COI. Application of the processes of curriculum and instruction planning, implementation, and evaluation in an existing organization.
640. **EDUCATIONAL PLANT PLANNING (4-5).** Development of educational plants; relationships between curriculum and plant; trends in plant design; analysis of physical conditions, relationships of professional and lay personnel in educational plant planning.
641. **EDUCATIONAL FORECASTING (4-5).** Pr., Advanced Statistics Course. A systematic review and analysis of future literature and research and their implications for education. Development and technological forecasting techniques, both quantitative and qualitative. Forecasting of possible futures and identification of possible alternatives.
642. **COMPUTERS IN EDUCATIONAL ADMINISTRATION (4-5).** Pr., EM 570 or COI. The use of computers and microcomputers in educational settings with a specific focus on those applications in administration including purchase of suitable software and hardware.
646. **DIRECTED INDEPENDENT STUDY (1-6).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student at regular intervals.
647. **STUDIES FOR COMPREHENSIVE EDUCATIONAL PLANNING (4-5).** Principles and procedures for collecting, analyzing, and utilizing data in the process of educational planning, including such topics as community characteristics, including power structure; economic bases and population; system characteristics, including administrative organization, finance, personnel, physical facilities, and instructional program.
650. **SEMINAR IN AREA OF SPECIALIZATION (1-10).** Advanced graduate students and professors pursue cooperatively selected concepts and theoretical formulations.
652. **CURRENT PROBLEMS AND ISSUES IN EDUCATIONAL ADMINISTRATION (4-5).** The problems, issues, and trends affecting educational institutions with particular attention to development of administrative procedures to cope with the extensive changes occurring in education.
660. **ORGANIZATION AND ADMINISTRATION OF HIGHER EDUCATION (4-5).** Pr., EDL 663 or 665. For educational leaders in higher education. The organization, administration, and evaluation of institutions in higher education in terms of the academic program, student personnel services, business affairs, and related programs including relations between higher education and the state and federal government.
661. **FINANCING OF HIGHER EDUCATION (4-5).** Theoretical bases for the use of taxation to support postsecondary education; student fees and tuition; financing and planning for higher education needs; cost benefit; budgeting and accounting; capital outlay; federal role in supporting higher education.
662. **HIGHER EDUCATION LAW (4-5).** Constitutional and statutory provisions for higher education and analysis of judicial decisions affecting postsecondary institutions of education.
663. **THE AMERICAN COLLEGE AND UNIVERSITY (4-5).** Philosophy and function, the university and social change, the community college, academic freedom, student-faculty-community relationships; international flow of educational ideas, government cultural programs, higher education and the state.
665. **THE COMMUNITY COLLEGE (4-5).** The rise and development of the community/junior college in American education; its history, philosophy, and functions.
666. **UNDERGRADUATE INSTRUCTION IN HIGHER EDUCATION (4-5).** Pr., EDL 663 or 665 or COI. The development and selection of appropriate curricular materials and effective teaching strategies. Evaluation of instruction and learning effectiveness in undergraduate programs of higher education.
668. **THE COMMUNITY COLLEGE PROGRAM (4-5).** The comprehensive community-junior college designed to improve competencies in program planning, evaluation, and administration.
669. **STUDENT PERSONNEL WORK IN HIGHER EDUCATION (4-5).** Pr., CCP 621. Theories, principles, practices, organization, administration, and evaluation of student personnel services in higher education.
685. **ADMINISTRATIVE ORGANIZATION AND BEHAVIOR (4-5).** Current theories and concepts of formal organization and of collective behavior. Includes a social-psychological approach to organizations, and treats current trends in organizing of instruction.
686. **ADMINISTRATION AND POLICY FORMATION (4-5).** Analysis of basic social forces, antecedent movements, and political action leading to formal enactment of educational policy at national, state, and local levels. Consideration is given to the roles and functions of governing and regulating boards and agencies.
695. **PRACTICUM (1-15).** Students get experiences closely relating theory and practice, usually carried on simultaneously.

EDL courses 660, 663, 665, 666, and 669, along with CCP 653 and 654, constitute a core for the development of programs of study in higher education. Other offerings, in both academic and professional fields, are available for the completion of advanced programs. These include educational leadership; foundations of education; psychology; student personnel; vocational and technical education; professional and academic preparation for teaching in agricultural sciences; business administration, economics and sociology, English, health and physical education, history, human sciences, mathematics, music, philosophy, physical and biological sciences, and speech.

The following research/field project credit options are available in each department according to the levels of degree study offered in the department.

699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

COURSES IN EDUCATIONAL MEDIA (EM)

The program in educational media provides for certification at the A level and AA level for media specialists. Many courses are open to graduate level majors in other program areas of the college and the university.

The Instructional Design program emphasizes the application of instructional design technology, including computers, into the learning process. These courses are open to training directors in industry, business, and the military as well as specialists in education.

200. **EDUCATIONAL MEDIA (2). LAB. (4).** Basic principles of library/media center usage includes audiovisual equipment operation, production of basic AV materials, retrieval, and utilization of library materials, and selected basic skills of instructional design.
370. **MICROCOMPUTER CONCEPTS AND APPLICATIONS IN EDUCATION (4). LEC. 3, LAB. 2.** An introduction to microcomputer uses in education.

ADVANCED UNDERGRADUATE AND GRADUATE

510. **MEDIA FOR CHILDREN (4).** Pr., junior standing. Examination and evaluation of print and other types of materials in view of their relevance to the needs and interests of various age and grade levels of elementary school children. Study of selection aids, principles, and criteria for selecting materials.
530. **REFERENCE MATERIALS AND SERVICES (4).** Pr., junior standing. Study and evaluation of basic reference sources for learning resources centers. Introduction to research methods needed in locating information to support the curriculum of the school.
550. **CLASSIFICATION AND CATALOGING OF MEDIA (4).** Pr., junior standing. Principles and procedures of classifying and cataloging books and other printed materials, filmstrips, recordings, and community resources. The vertical file, the Dewey decimal system of classification, Wilson and Library of Congress printed cards, and subject headings are studied.
570. **THE MICROCOMPUTER AS AN EDUCATIONAL MEDIUM (4). LEC. 3, LAB. 2.** Pr., junior standing. Applications of microcomputers in education for instruction and administration, present and future.

GRADUATE

600. **TECHNOLOGY IN EDUCATION (4).** Theory, problems, procedures and standards in the utilization of technology.
605. **MODES OF MEDIATED INSTRUCTION (4).** Pr., EM 600. Development and integration of media into learning prescriptions. Emphasis is on the assigning of media in a total systems approach to curriculum building.
610. **SELECTION AND USAGE OF MEDIA FOR YOUTH (4).** Pr., EM 510 or COI. Evaluation, selection, and use of print and non-print media for children and young adults, including materials for multicultural, special, gifted education.
620. **PROGRAMS AND PRINCIPLES OF MEDIA SERVICES (4).** Place and function of media services in school programs. Functions of school media personnel in leadership and principle application in media program development. Course work includes Practicum experience.
625. **INTERNSHIP (3-15).** Supervised on-the-job experience in a school, college, or other appropriate setting. These experiences accompanied by regularly scheduled on-campus discussion periods are designed to provide evaluation and analysis of the intern experience.
626. **PROBLEMS IN THE ADMINISTRATION OF MEDIA SERVICES (4).** Current problems relating to an effective program of media services. Experiences include problem identification and resolution in the field.
630. **COMMUNITY INFORMATION AND REFERENCE SOURCES (4).** Pr., EM 530. The use of reference sources, information networks, community surveys and group decision-making in relating school media programs to the community.
640. **ORGANIZATION AND ADMINISTRATION OF MEDIA CENTERS (4).** Basic organization of books, non-book materials, and services for effective use in media centers. Administering the budget, selection and purchase of materials, preparation of materials for use, circulation of materials, inventory, care and repair of materials, and instruction in the use of media are considered.
646. **DIRECTED INDEPENDENT STUDY. (1-10).** Special study in which the student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
650. **SEMINAR IN EDUCATIONAL MEDIA (3-10).** Pr., consent of dept. head. May be repeated for credit not to exceed 10 hours. Special problems formulated around student's area of specialization designed to engage students in intense study and analysis of problems identified.
651. **RESEARCH IN EDUCATIONAL MEDIA (4).** Pr., FED 661 and 18 hours of appropriate media courses. Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
654. **EVALUATION OF MEDIA PROGRAMS (4).** Pr., FED 661 and 18 hours of appropriate media courses. Intensive study of factors contributing to effective organizational configurations. Experiences include participation in evaluation of field programs.

670. **COMPUTER-BASED EDUCATION: AUTHORING SYSTEMS (4).** LEC. 3, LAB. 2. Pr., EM 600 or COI: Design, development, and implementation of computer-assisted instructional software.
680. **COMPUTER-BASED EDUCATION: PROGRAMMING SYSTEMS (4).** Pr., EM 570 or COI: Programming a microcomputer in the BASIC language with an emphasis on educational applications.
685. **COMPUTER GRAPHICS FOR EDUCATIONAL APPLICATIONS (4).** LEC. 4. Pr., one basic course in computer applications or programming and COI: Principles and processes for computer graphic production for educators developing problem-solving applications (initially for Apple II series computers).
690. **MEDIA RESOURCES PLANNING AND PRESENTATIONS (4).** LEC. 2, LAB. 4. Pr., COI: Selecting, planning, preparing, and presenting media resources, including access and selection, using materials and equipment, producing materials, planning presentations, and validating use of resources.
695. **PRACTICUM (1-15).** Experiences closely relating theory and practice, usually carried on simultaneously.
696. **GRADUATE RESEARCH FORUM (1).** May be repeated but counted only once toward graduation. Presentations by graduate students of research proposals and/or findings. Analysis of procedures and findings.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

COURSES IN FOUNDATIONS OF EDUCATION (FED)

213. **HUMAN GROWTH AND DEVELOPMENT (5).** LEC. 4, LAB. 2. Pr., sophomore standing. Teacher and the school in the direction, measurement, and evaluation of individual growth and development by using various sociological, philosophical, and psychological theories. Laboratory experiences required.
214. **PSYCHOLOGICAL FOUNDATIONS OF EDUCATION (5).** LEC. 4, LAB. 2. Pr., sophomore standing. The psychological dimensions of the educational process. The processes, conditions, and evaluation of learning, and related methodologies of teaching. Laboratory experiences and evaluation of the Pre-teaching Field Experience. For description of the Pre-teaching Field Experience Program, see Professional Requirements, Sect. C under College of Education.
270. **INTRODUCTION TO STATISTICAL ANALYSIS IN THE HUMAN SCIENCES (3).** LEC. 3. Pr., MH 140 or MH 160. The fundamentals of research design and analysis in nursing, education and related human sciences. Practical experience in the application of the binomial, normal curve, Poisson and Chi-square distribution functions in research design. Required in Professional Nursing Curriculum. Non-nursing students must have COI.
300. **EDUCATIONAL PSYCHOLOGY (5).** LEC. 4, LAB. 2. Pr., sophomore standing. Learning and motivation from a developmental perspective for the purpose of gaining insight into an understanding of the learning process and of the individual involved in this process. This experience provides an integrated theoretical base for educational practice. Enrollment limited to education majors.
320. **SOCIAL FOUNDATIONS OF EDUCATION (5).** LEC. 4, LAB. 2. Pr., junior standing. The relationship of the school and contemporary society and the influence of cultural heterogeneity upon the teaching-learning process. Laboratory experiences focus upon mastering basic tools for studying the school as a dynamic social system.
330. **CULTURAL FOUNDATIONS OF EDUCATION (5).** LEC. 4, LAB. 2. Pr., junior standing. Analysis of education giving emphasis to the act of teaching both in theory and practice. Regardless of disciplinary emphasis, the concerns of educational purpose, curriculum and pedagogy will be the focus of the courses. Students will select one of the following disciplinary options: (a) philosophy of education, (b) history of education, (c) social foundations of education, (d) comparative education. Enrollment limited to education majors.
400. **MEASUREMENT AND EVALUATION IN EDUCATION (5).** LEC. 4, LAB. 2. Pr., FED 300 or equivalent and junior standing. Measurement and evaluation as an integral part of the teaching-learning process. Focus is on (a) identifying and defining intended learning outcomes, (b) constructing or selecting tests and other evaluation instruments that are relevant to specified outcomes, and (c) interpreting and using results in determining attainment of educational goals and improving learning and instruction. Enrollment limited to education majors.
446. **DIRECTED INDEPENDENT STUDY (1-10).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
480. **PHILOSOPHICAL FOUNDATIONS OF EDUCATION (5).** Educational movements and ideas in Western culture which influence modern educational practices. Evaluation of laboratory experiences and the Professional Internship through philosophical analysis of educational concepts and problems.

ADVANCED UNDERGRADUATE AND GRADUATE

520. **EDUCATIONAL SOCIOLOGY (4-5).** Pr., SY 201 or equivalent. The school as a social institution. Group interaction: formal and informal structure and organization, and the relationship of education to other social institutions.
534. **PERSONALITY DYNAMICS AND EFFECTIVE BEHAVIOR (4-5).** Pr., ten hours of psychology. Analysis of adaptive and maladaptive behavior. Not open to students majoring in psychology.

GRADUATE

600. **EDUCATION IN MODERN SOCIETY (4-5).** Pr., graduate standing. The interaction of historical, philosophical and sociological considerations affecting education in modern society.
601. **SOCIAL FOUNDATIONS OF EDUCATION (4-5).** Pr., graduate standing. Man as a social being, his social relationships and inventions, and value patterns. Directions and support of educational developments in relation to various socio-economic structures.

610. **MEASUREMENT AND EVALUATION OF THE INDIVIDUAL IN EDUCATION (4-5).** An in depth study of the principles and techniques of measurement and evaluation which are applicable to educational settings. Emphasis will be given to both the theoretical and the practical. Special problems and issues will also be examined.
615. **FOUNDATIONS OF CLASSROOM MANAGEMENT (4-5).** Focus on analysis and comparison of various theories of classroom management and their applications to the classroom situation.
617. **ADVANCED EDUCATIONAL PSYCHOLOGY (4-5).** Major psychological theories and research which have direct implication for educational practice. Key topics include learning, the learner, individual differences, motivation, discipline, measurement and evaluation with emphasis on the practical as well as the theoretical.
618. **IMPLICATIONS OF LEARNING THEORY FOR EDUCATION (4-5).** Theories of learning including the appropriate aspects of acquisition, transfer, motivation, and retention with comparative analysis of theories and educational implications.
619. **EDUCATIONAL IMPLICATIONS OF HUMAN DEVELOPMENT (4-5).** A critical study of major concepts of human growth and development.
634. **HISTORY OF EDUCATION (4-5).** The emergence of education as a formal institution, tracing its historical development from early Greek times to the present and emphasizing the historical antecedents which have helped to shape the role and functions of education in Western culture.
636. **PHILOSOPHY OF EDUCATION IN AMERICA (4-5).** Major American contributions to the philosophy of education and their influence on educational practice. Need for, and procedures in, reexamining concepts in the light of recent scientific and cultural developments.
640. **EDUCATIONAL PSYCHOLOGY (4-5).** Psychology as it is applied in education. Central subject matter is the learner, the teacher, and the teaching-learning process. Open only to students in the fifth-year program.
641. **CULTURAL FOUNDATIONS OF EDUCATION (2-4).** Emphasis on turning points in pedagogical reform in the history of Western educational thought. Further, concern for the major social, economic, and political factors which gave rise to both the development and acceptance of methods will be considered. Open only to fifth-year students.
642. **MEASUREMENT IN EDUCATION (4-5).** Measurement concepts and techniques appropriate for the design, implementation, analysis, and interpretation of evaluating teaching and learning activities. Special emphasis on teacher-made evaluation procedures and evaluation of teaching effectiveness. Open only to fifth-year students.
645. **CURRENT PROBLEMS AND ISSUES IN THE FOUNDATIONS OF EDUCATION (4-5).** Pr., teaching experience. Selected issues in the sociological, psychological, historical and philosophical foundations of education which affect the total educational enterprise and its relation to society.
646. **DIRECTED INDEPENDENT STUDY (1-6).** Special study in which the student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student at regular intervals.
647. **FOUNDATIONS IN CURRICULUM AND INSTRUCTION (4-5).** Introduction to principles and processes related to curricular and instructional development, designs, and utilization. Emphasis on historical developments, problems in curricular organization and evaluation, forces affecting curriculum change, and current issues and significant research that contributes to the general knowledge of curriculum and instruction.
650. **SEMINAR IN FOUNDATIONS OF EDUCATION (3-10).** May be repeated for credit not to exceed 10 hours. Historical, philosophical, sociological, psychological, and research issues and their impact on education.
661. **RESEARCH AND EXPERIMENTATION IN EDUCATION (4-5).** Research methods, design of experiments, and evaluation; data sources, research planning, elements of scientific method and proposal writing. Current trends in educational research.
663. **THEORY AND METHODOLOGY OF QUALITATIVE RESEARCH (4-5).** Pr., FED 661. An introduction to such naturalistic research approaches as ethnography, historiography, systematic observation, and case study as they apply to educational theory and practice.
672. **APPLIED EDUCATIONAL STATISTICS I (4-5).** Pr., FED 661, passing score on entry exam including basic math operations, elementary algebra, and elementary knowledge of research terminology. Introductory basic statistical concepts and their application to educational research problems. Topics include issues related to descriptive statistics and basic inferential statistics.
673. **APPLIED EDUCATIONAL STATISTICS II (4-5).** Pr., FED 672. The concepts and applications of analysis of variance and of covariance as they relate to educational research issues.
702. **SOCIAL CHANGE AND EDUCATIONAL DEVELOPMENT (4-5).** Pr., graduate standing. Major current theories of social change and their practical application in improving the school and directing social innovations which sustain educational improvements.
703. **SOCIAL AND CULTURAL DIVERSITY AND AMERICAN EDUCATION (4-5).** An investigation of the educational responses to social and cultural pluralism in contemporary American society.
705. **URBANIZATION AND EDUCATIONAL DEVELOPMENT (4-5).** Developments in the concentration of population, wealth, and cultural dissemination in urban areas. The changing character of this concentration, and its impact on educational agencies regarding different population groups and different areas of educational service.
737. **DEVELOPMENT AND STATUS OF EDUCATIONAL PHILOSOPHY (4-5).** Pr., FED 636 or consent of department head. Development of philosophy of education from the standpoint of its implications for educational practice. Several patterns of thought are considered including supernaturalism, idealism, realism, humanism, communism, existentialism, and experimentalism.
739. **COMPARATIVE EDUCATION (4-5).** Pr., two quarters of graduate study or consent of department head. Comparative study of selected educational systems in nations in various stages of development. Special attention given to American educational issues in cross cultural contexts.

762. **NONPARAMETRIC STATISTICAL ANALYSIS (4-5).** Pr., FED 661. (Credit not allowed to meet minimum research requirements for doctoral students.) Common nonparametric statistical tests with special emphasis on nominal and ordinal data; estimation and multi-sample designs; emphasis on education applications and statistical models.
775. **MULTIVARIATE STATISTICAL ANALYSIS IN EDUCATIONAL RESEARCH I (4-5).** Pr., FED 673. The concepts and educational applications of the general linear model as it relates to multiple regression analysis, trend analysis, discriminant analysis, and canonical analysis.
776. **MULTIVARIATE STATISTICAL ANALYSIS IN EDUCATIONAL RESEARCH II (4-5).** Pr., FED 775. The concepts and educational applications of the general linear model as it relates to multivariate analysis of variance and Hotelling's T^2 .
780. **EDUCATIONAL PROGRAM AND CURRICULUM EVALUATION (4-5).** Pr., FED 610, 661, or COI. An intensive and critical study of various views of program and curriculum evaluation in education. Methods of evaluating programs will be examined, using available models and data gathering procedures.
782. **TECHNIQUES OF SCALE CONSTRUCTION (4-5).** Pr., FED 610 or PG 515 and FED 672 or COI. The rationale and development of instruments to assess attitudes will be presented and the analysis of data from questionnaires, surveys and other scale types will be considered. Students will be required to design and conduct a preliminary validation of an attitude scale.
785. **THEORY AND FUNCTION OF EDUCATIONAL MEASUREMENT (4-5).** Pr., FED 610, 673 or equivalents. Theory and statistical properties of test scores, classical test score theory and latent trait models will be presented. Emphasis will be on the conceptual as well as the technological application of test theory to education.
796. **GRADUATE RESEARCH FORUM (1).** Pr., FED 661. May be repeated but counted only once toward graduation. Presentations by graduate students of research proposals and/or findings. Analysis of procedures and findings.

Electrical Engineering (EE)

Professors Irwin, Head, Aldridge, Boland, Honnell, Jaeger, Lowry, Phillips,
Rose, Russell, and Shumpert

Georgia Power Professor Grigsby

Associate Professors Davidson, Feaster, Greene, Nelson, Rao, Rogers,
Sheble, Slagh, and Tzeng

Square-D Associate Professor Gross

Assistant Professors M. Baginski, T. Baginski, Beaty, Esmelioglu, Gordon, Hopkins,
Hung, James, Johnson, Morse, Nelms, Park, Riggs, Roppel, and Wu
Instructor Goggans

Non-engineering students may enroll only with departmental consent.

201. **INTRODUCTION TO COMPUTER PROGRAMMING (3).** Pr., MH 163. An introduction to the Basic and Fortran computer languages with emphasis on the use of the digital computer as an engineering tool.
261. **LINEAR CIRCUIT ANALYSIS I (3).** Pr., PS 221, EE 201 for EE students. Coreq., MH 265. Basic laws and concepts; resistive circuits, linear algebra, R-L and R-C circuits.
263. **LINEAR CIRCUIT ANALYSIS II (4).** Pr., EE 261. Coreq., EE 264 for EE students. Sinusoidal forcing functions and phasors; steady-state response, average power and RMS values, polyphase circuits, and magnetically coupled circuits.
264. **LINEAR CIRCUIT ANALYSIS II LABORATORY (1).** LAB. 3. Coreq., EE 263. Experiments in electrical circuits.
301. **ENGINEERING INSTRUMENTATION (3).** LEC. 2, LAB. 3. Pr., EE 263 or EE 302. Principles of instrumentation. The detection and measurement of physical quantities with emphasis on transducers, signal processing, and display. (Not open to Electrical Engineering majors.)
302. **INTRODUCTION TO ELECTRICAL ENGINEERING I (3).** Pr., PS 221, coreq., MH 265. Electrical circuit analysis — dc, ac, and transient; power devices and systems.
303. **INTRODUCTION TO ELECTRICAL ENGINEERING II (3).** Pr., EE 302. Digital systems; electronic devices; amplifier concepts.
330. **ANALYSIS AND DESIGN OF LOGIC CIRCUITS (4).** LEC. 3, LAB. 3. Pr., EE 201. Binary numbers; Boolean algebra, Boolean functions, truth tables and Karnaugh maps; gates and flipflops; combinational and sequential logic circuits; design methods and design verification; logic families and logic technologies.
335. **COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING (4).** LEC. 3, LAB. 3. Pr., EE 330. Stored program computers, hardware components, software components; data representation and number systems; instruction sets, addressing modes, and assembly language programming; subroutines and macros; assemblers; loaders, linkers, and operating systems; memory, memory cycle and memory hierarchy; arithmetic/logic unit; control unit, program counter, and instruction cycle; input/output, input/output programming, and interrupts. (Credit is not allowed for both EE 335 and CSE 335.)
340. **COMMUNICATIONS I (3).** Pr., EE 362. Fourier series, Fourier transforms, spectral analysis, amplitude and angle modulation, frequency division multiplexing.
341. **COMMUNICATIONS II (4).** LEC. 3, LAB. 3. Pr., EE 340, EE 311. Pulse modulation, time-division multiplexing, random processes, correlation analysis, power spectra, information and digital transmission, quantization noise, digital modulation; ASK, PSK, FSK; introduction to digital signal processing.
351. **LINEAR FEEDBACK SYSTEMS (4).** Pr., EE 362 or COI for non-EE students. Transfer functions, transient and steady state performance, stability, design and compensation of feedback control systems.

352. **DISCRETE AND NONLINEAR CONTROL SYSTEMS (4). LEC. 3, LAB. 3.** Pr., EE 351. Analysis and design of discrete control systems, with emphasis on digital control systems; describing functions; state-plane analysis.
362. **LINEAR SYSTEMS (5). LEC. 4, LAB. 3.** Pr., MH 266, EE 263, 264. Fourier series, Fourier transforms, Laplace transforms.
371. **ELECTRONICS I (3).** Pr., EE 263 or 302. Semiconductors, principles of electronic devices, design of low frequency electronic circuits.
374. **ELECTRONICS II (4).** Pr., EE 371. Integrated circuits, high frequency limitations of electronic devices, frequency response, feedback, design of high frequency and feedback electronic circuits.
385. **POWER SYSTEM ANALYSIS I (4).** Pr., EE 263 or 302. Basic power system terminology. Synchronous machines, transmission lines, and transformer system models. Symmetrical components and load flow analysis.
391. **ELECTROMAGNETIC PRINCIPLES I (3).** Pr., PS 221, PS 222, MH 265. Scalar and vector fields, Coulomb's and Gauss' laws, the electrostatic field, Biot-Savart's and Ampere's laws, the magnetostatic field, Laplace's and Poisson's equations; coordinated classroom and laboratory demonstrations.
392. **ELECTROMAGNETIC PRINCIPLES II (3).** Pr., EE 263, EE 391. Faraday's law, electrodynamics, Maxwell's equations, the wave equation and its solution, wave reflection, refraction, and diffraction, transmission line concepts, coordinated classroom and laboratory demonstrations.
- 401-402. **SENIOR DESIGN PROJECTS (3-3).** Pr., senior standing and COI. A capstone design project which draws on the accumulated curricular experience. Particular project sections may have additional requisites. Must be taken in consecutive quarters. 401 will be graded S-U.
430. **COMPUTER SYSTEM DESIGN (4). LEC. 3, LAB. 3.** Pr., EE 335. Computer I/O, I/O hardware, programmed I/O, interrupts, DMA, and I/O programming; microprocessors, support chips, peripherals, and programming; system specification, design, and verification.
475. **ELECTRONICS III (5). LEC. 4, LAB. 3.** Pr., EE 330, 374. Oscillators, IC operational amplifiers, linear analog systems, nonlinear analog systems, IC logic families, power circuits.
481. **ELECTROMECHANICAL ENERGY CONVERSION (5).** Coreq., EE 385. Basic concepts in electromagnetic-mechanical energy conversion. Linear and nonlinear analysis of transformers, dc machines, synchronous, and induction machines. Operation in the generator and motor modes.
489. **ELECTROMECHANICAL ENERGY CONVERSION LABORATORY (2). LAB. 6.** Coreq., EE 481. Experiments involving electromechanical energy conversion devices.
490. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
492. **APPLIED ELECTROMAGNETICS (4). LEC. 3, LAB. 3.** Pr., EE 392. Analysis and design of commonly-used waveguides and guided-wave structures and devices. Introduction to and design of simple antennas and other radiating structures. Coordinated classroom demonstrations and laboratory experiments.
493. **INTRODUCTION TO ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE (3).** Pr., EE 362, 371, 392. Electrical noise suppression and control in electrical systems.
494. **RADAR SYSTEMS (3).** Pr., EE 340, 392. Introduction to the fundamentals of radar systems.
495. **MICROWAVE COMPONENTS AND SYSTEMS DESIGN (3).** Pr., MH 266, EE 492. Design guidelines for microwave systems including waveguides, waveguide devices, microwave sources including klystrons, magnetrons, TWT's, and solid-state devices. Coordinated homework design projects and classroom demonstrations and presentations.
496. **DESIGN OF ANTENNAS AND ANTENNA SYSTEMS (3).** Pr., MH 266, EE 492. Design of antenna elements and phased arrays of these elements, antenna system performance parameters and guidelines, antenna measurements and measurement systems.
497. **DESIGN PROJECTS (2).** Pr., senior standing and COI. Individual or group design projects. May not be taken more than twice.
498. **HONORS THESIS (1-6).** Pr., COI and department head approval. Individual student endeavor consisting of directed research and writing of honors thesis. (EE Honors Program students only. May be repeated once for a maximum of 6 total credit hours.)
499. **SPECIAL PROJECTS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.

ADVANCED UNDERGRADUATE AND GRADUATE

521. **MACHINE INTELLIGENCE AND ROBOTICS I (4). LEC. 3, LAB. 3.** Pr., EE 430, COI. Software and hardware pertaining to the design of intelligent computer systems. Problem representation, game playing. State space search techniques, problem reduction search techniques, Mini-Maxing-Alpha Beta Pruning; sensors, transducers, optics; automatic controllers, numeric controller machines, industrial and research robots.
523. **ADVANCED DIGITAL CIRCUIT DESIGN (4). LEC. 3, LAB. 3.** Pr., EE 430. Advanced design of digital logic circuits, using discrete gates and programmable logic devices, hardware description languages, circuit simulation for design verification and analysis, fault diagnosis and testing.
524. **MICROPROCESSORS AND MICROCOMPUTERS (3).** Pr., EE 430 or COI. Microcomputer chip sets, microcomputer system design, machine programming, PROM programming, interfacing, applications, bit-sliced microprocessors, advanced microprocessor/microcomputer architectures.
525. **MICROCOMPUTER DESIGN LABORATORY (3). LEC. 1, LAB. 6.** Coreq., EE 524 or COI. Students design and build a microcomputer system and do an application project with the system.
530. **COMPUTER ARCHITECTURE AND DESIGN (4).** Pr., EE 430. Structural organization and hardware design of digital computers; register transfers; micro-operations, control units and timing; instruction set design; microprogramming; automated hardware design aids. (Credit is not allowed for both EE 530 and CSE 530.)

531. **DESIGN OF MICROPROGRAMMED DIGITAL SYSTEMS (3).** Pr., EE 530 or equivalent. Design of application-specific processors using bit-slice components and microprogrammed control. Students design and debug microprograms for an application-specific processor, using a special laboratory design module. (Credit is not allowed for both EE 531 and CSE 531.)
532. **COMPUTER NETWORKS (3).** Pr., EE 430 or COI. Introduction to distributed systems, network architectures, protocols, digital communication links, data management, and related software design. (Credit is not allowed for both EE 532 and CSE 532.)
533. **PARALLEL PROCESSING (3).** Pr., EE 530 or equivalent and CSE 500. Hardware and software elements of multiprocessors, multicomputers, pipeline and array machines, and data flow architecture; design principles related to machine structures, control software and hardware, data storage and access, programming, languages, and application algorithms. (Credit is not allowed for both EE 533 and CSE 533.)
534. **DISTRIBUTED COMPUTING I (3).** Pr., EE 530 or equivalent. Overview of distributed data processing concepts; hardware architectures and configurations; system and application software design; problem design; interprocess communication; system performance evaluation; fault tolerance. Decentralized control, distributed operating systems, and distributed data bases. (Credit is not allowed for both EE 534 and CSE 534.)
545. **AUTOMATIC SPEECH PROCESSING (4).** Pr., EE 341. Introduction to Fourier, Z, and fast Fourier transforms; discrete time signals and systems; digital models of the speech signals; speech coding schemes; spectrograms, cepstrum, and linear prediction analysis of speech; time domain techniques; introduction to human-machine communication by voice.
546. **INTRODUCTION TO PATTERN RECOGNITION (3).** Pr., EE 341. Decision functions, distance measures and clustering. Bayes and minimax pattern classifiers, preprocessing and feature extraction.
547. **DIGITAL FILTERS AND SIGNAL PROCESSING — DESIGN (5).** LEC. 4, LAB. 3. Pr., EE 341 and EE 352. The digital processing of signals, digital filters, the discrete and the fast Fourier transform, discrete random signals, power spectrum estimation, and autocorrelation analysis.
551. **THE DESIGN OF ANALOG AND DIGITAL COMPUTER SIMULATIONS OF PHYSICAL SYSTEMS (5).** LEC. 3, LAB. 6. Coreq., EE 352. Analog and Digital Computer simulation of physical systems; optimization techniques for design; parameter variation to achieve design objectives.
552. **MODERN DIGITAL CONTROL SYSTEMS DESIGN (3).** Pr., EE 352. Linear algebra, state variable modeling, pole assignment design, optimal design, design of state estimators.
553. **MICROPROCESSOR CONTROL SYSTEMS DESIGN (5).** LEC. 4, LAB. 3. Pr., EE 430. Coreq., EE 352. Electrical transducers. Characteristics of operational amplifiers used for instrumentation. Signal conditioning operations. Data conversion systems. Signal transmission methods. Process controllers. Microprocessor controller examples.
554. **LINEAR SYSTEMS WITH RANDOM SIGNAL INPUTS (4).** Pr., EE 311, Coreq., EE 352. Review of probability and random variables, random signals, analog and discrete system response to random signals, Monte Carlo simulations.
570. **PHYSICAL ELECTRONICS I (3).** Pr., EE 391, PS 320. Studies of the electrical properties of materials with emphasis on semiconductors.
571. **PHYSICAL ELECTRONICS II (3).** Pr., EE 570. Physical properties of electrical and electronic devices.
572. **MICROELECTRONICS — FABRICATION AND DESIGN (4).** LEC. 3, LAB. 3. Pr., EE 374. Introduction to monolithic integrated circuit technology. Bipolar and MOSFET processes and structures. Elements of layout, design, fabrication, and applications. Experiments in microelectronic technologies.
573. **HYBRID ELECTRONIC DESIGN (4).** LAB. 3, LAB. 3. Pr., EE 374 or COI. Technology and design of thick and thin film hybrids for implementations of circuit schematics. Techniques are demonstrated in the laboratory and a functional circuit is designed, fabricated, and tested.
574. **INTRODUCTION TO OPTOELECTRONICS (3).** Pr., EE 392. Optical propagation modes, fiber optics, lasers, electro-optic modulation, detectors, and noise in optical systems.
575. **ANALOG ELECTRONIC DESIGN (3).** Pr., EE 475 and COI. Design of analog integrated circuits; current sources, differential amplifiers, output stages, operational amplifiers, frequency response. Nonlinear circuits: multipliers and phase-locked loops.
576. **DIGITAL ELECTRONIC DESIGN (3).** Pr., EE 374. Solid-state device switching characteristics; design simulation and layout of electronic circuits including logic gates, registers, and memory arrays; full custom, standard cell and gate array design; CAD systems for layout and simulation; student teams will be responsible for a LSI chip design.
579. **INTRODUCTION TO PLASMA ENGINEERING (3).** Pr., EE 391 or COI. Electrical breakdown and discharges in gases, basic plasma theories, gas lasers, plasma processing of materials, controlled fusion, plasma switches, microwave generation.
581. **APPLICATIONS AND DESIGN OF ELECTROMECHANICAL SYSTEMS (3).** Pr., EE 481 or COI. Transformer connections. NEMA and IEEE Motor Standards. Matching motors to cyclic loads. Machine transient analysis.
582. **APPLICATION AND DESIGN OF POWER ELECTRONIC SYSTEMS (3).** Pr., EE 481 or COI. Polyphase power rectifiers and inverters. Solid state drives for rotating machines. Characteristics of high power solid state components.
583. **ELECTRICAL INSULATION DESIGN (3).** Pr., EE 392. Design of insulation for all engineering applications. Includes vacuum, gaseous, liquid, and solid insulations. Coordinated homework design projects and classroom demonstrations and presentations.
585. **DESIGN OF POWER SYSTEM PROTECTION (3).** Pr., EE 385 or COI. Symmetrical components and analysis of unbalanced faults on power systems. Relay and protection schemes.

586. **DIRECT ENERGY CONVERSION (3).** Pr., EE 481, 391, ME 301, COI. Fundamentals and energy considerations; thermoelectric devices, photovoltaic devices, thermionic devices, magnetohydrodynamic power generation, batteries and fuel cells. Ecological consideration.
587. **DESIGN OF POWER SYSTEM CONTROLS (3).** Pr., EE 385 or COI. P-f control loop, automatic generation control, economic dispatch, transmission losses, reserve allocation, decoupled power flow, matrix inversion Lemma, Q-V control.
588. **POWER SYSTEM PLANNING AND DESIGN (3).** Pr., MH 266, EE 385, or COI. Reliability techniques applied to the planning and design of generation, transmission, and distribution facilities of electrical power systems.
590. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
597. **SPECIAL DESIGN TOPICS (3).** Pr., senior standing and COI. May not be taken more than twice.

GRADUATE

601. **LINEAR ANALYSIS (5).** Methods of analysis, the exponential forcing function, Fourier series, Fourier transforms, Laplace transforms, and superposition integrals. Complex variables and contour integration.
602. **NONDETERMINISTIC SYSTEM ANALYSIS (3).** Pr., COI. Applications of probability, random variables, and stochastic processes in Electrical Engineering.
623. **COMPUTER-AIDED DIGITAL LOGIC DESIGN (4).** LEC. 3, LAB. 3. Pr., EE 430. Computer-aided design of digital logic circuits, using discrete gates and programmable logic devices. Hardware description languages, circuit simulation for design verification and analysis, fault diagnosis and testing, comprehensive design project.
624. **MICROPROCESSOR-BASED SYSTEMS (3).** Pr., EE 430 or COI. Survey of microprocessor-based systems, including general purpose 8-, 16-, and 32-bit microprocessors and single-chip microcontrollers, assembly language programming, peripheral device interfacing.
625. **ADVANCED MICROPROCESSOR SYSTEM DESIGN (3).** Pr., EE 430 or COI. Students design, implement, and debug a complete microcomputer system consisting of processor, memory, and I/O cards.
630. **COMPUTER ARCHITECTURE I (4).** Pr., EE 430. Structural organization and hardware design of digital computers, hardware description languages, register transfers, micro-operations, control units and timing, instruction set design, and microprogramming. Students design and simulate a central processing unit.
631. **MICROPROGRAMMING AND BIT-SLICE DESIGN (3).** Pr., EE 530 or equivalent. Design of application-specific processors using bit-slice components and microprogrammed control units. Students design, implement, and debug a microprogrammed processor design for a given application.
632. **COMPUTER NETWORKS AND DATA COMMUNICATION (3).** Pr., EE 430. Introduction to computer networks, the OSI layered network model, local and wide-area networks, applications and case studies.
633. **PARALLEL AND CONCURRENT PROCESSING (3).** Pr., EE 530 or equivalent. Hardware and software elements of multiprocessors, pipeline and array machines, and data flow architectures; interprocessor communication, parallel system performance evaluation, control software and hardware, data storage and access, programming languages, application algorithms, and case studies.
634. **DISTRIBUTED DATA PROCESSING I (3).** Pr., EE 530. Overview of distributed data processing concepts, hardware architectures, system and application software, algorithm design, interprocess communication, system performance evaluation, fault tolerance, decentralized control, distributed databases, and case studies.
646. **PATTERN RECOGNITIONS (3).** Pr., EE 547. Decision functions, distance measures and clustering. Bayes and minimax pattern classifiers, preprocessing and feature extraction, syntactic pattern recognizers. Survey of applications.
651. **SIMULATION OF DYNAMIC PHYSICAL SYSTEMS (5).** LEC. 3, LAB. 6. Pr., COI. Simulation of dynamic physical systems by analog, digital, and hybrid computers, control system design by simulation, optimization techniques, advanced topics.
652. **MODERN METHODS IN CONTROL THEORY (3).** Pr., COI. Advanced state modeling, pole assignment, linear quadratic design, theory of state estimation, optimal estimators, system identification.
653. **CONTROL SYSTEMS SENSOR INTERFACING TO COMPUTERS (5).** LEC. 4, LAB. 3. Pr., EE 430. Coreq., EE 352. Transducers, signal conditioning, analog-to-digital and digital-to-analog conversion, noise problems, linearization, quantization.
654. **STOCHASTIC CONTROL SYSTEMS I (4).** Pr., COI. Review of probability and random variables, random signals, analog and discrete system response to random signals, Monte Carlo simulations, Kalman filtering project.
670. **SOLID STATE MATERIALS AND DEVICES I (3).** Pr., COI. Advanced studies of the electrical properties of materials including quantum mechanics, energy band theory, carrier transport and recombination-generation processes, junction theory.
671. **SOLID STATE MATERIALS AND DEVICES II (3).** Pr., EE 670 or COI. Advanced physical theory of bipolar and field-effect transistors including modeling theory, high level injection and large and small signal analysis.
672. **MICROELECTRONICS FABRICATION (4).** LEC. 3, LAB. 3. Pr., EE 475. Introduction to monolithic integrated circuit process technology and design concepts. Interaction and achievement of physical structure with electronic design is presented. Solid-state devices and circuits are designed and built to learn how processed parameters and layout affect performance.
673. **HYBRID MICROELECTRONICS (4).** LEC. 3, LAB. 3. Pr., EE 475 or COI. Advanced technology and design of thick and thin film hybrids for implementation of circuit schematics with emphasis on materials, processes and manufacturing practices. Functional circuits are fabricated and tested.

674. **OPTOELECTRONICS (3).** Pr., COI. Ray and beam propagation modes, optical resonators, lasers, electro-optic modulation, optical detectors, noise in optical systems, and selected current topics.
675. **ANALOG INTEGRATED CIRCUIT DESIGN (3).** Pr., EE 475 or COI. Bipolar and MOS integrated circuit technology and design including circuit design, simulation, and layout.
676. **DIGITAL INTEGRATED CIRCUIT DESIGN (3).** Pr., COI. Analysis, design simulation and layout of digital integrated circuits; solid-state switching device behavior; design of logic gates, static and dynamic memory and registers; testability; each student will be responsible for the design of a gate array or equivalent chip along with logic circuit templates and performance data.
678. **ADVANCED PROPERTIES OF MATERIALS (3).** Pr., EE 570 or COI. Transport properties of semiconductors, band structure, carrier lifetime, current flow, junction theory.
679. **INTRODUCTORY PLASMA THEORY (3).** Pr., EE 391 or COI. Electrical breakdown and discharges in gases, basic plasma theories, gas lasers, plasma processing of materials, controlled fusion, plasma switches, microwave generation.
681. **ELECTROMECHANICAL SYSTEMS (3).** Pr., EE 481 or COI. Transient analysis of rotating machinery. Applications of power transformers and motors.
682. **POWER ELECTRONIC SYSTEMS (3).** Pr., EE 481 or COI. Power electronic devices and circuits. Applications of power electronics to motor control and power conversion and conditioning.
685. **POWER SYSTEM PROTECTION (3).** Pr., EE 385 or COI. The analysis of power networks under faulted conditions. Power system protection techniques. Digital computer algorithms for fault analysis and protection.
686. **ADVANCED ENERGY CONVERSION (3).** Pr., EE 391, 481, ME 301, COI. Alternative methods of generating electric energy. Analysis and design of advanced energy conversion systems.
687. **POWER SYSTEM CONTROL (3).** Pr., EE 385 or COI. Advanced power flow analysis techniques, dispatch of power and energy, control of power system frequency and voltage.
688. **POWER SYSTEM RELIABILITY (3).** Pr., EE 385 or COI. Analysis of the reliability of power system generation, transmission and distribution facilities and the use of reliability measures in the planning of power system expansions.
690. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
692. **DIRECTED READING IN ELECTRICAL ENGINEERING (CREDIT TO BE ARRANGED.)**
695. **SEMINAR (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
698. **SPECIAL PROJECTS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 710-711. **ADVANCED ELECTROMAGNETIC THEORY I-II (3-3).** Pr., COI. A two-course sequence for students specializing in electromagnetics.
- 714-715. **NUMERICAL METHODS IN APPLIED ELECTROMAGNETICS I-II (3-3).** Pr., COI. A two-course sequence for students specializing in electromagnetics.
721. **SWITCHING THEORY (4).** Pr., EE 330 or equivalent. Special topics in switching theory and digital design. Multiple level circuits, decomposition, threshold and multiple-valued logic, linear sequential circuits, and issues in asynchronous sequential circuit design.
730. **COMPUTER ARCHITECTURE II (3).** Pr., EE 530 or equivalent. Computer architecture and design principles; computer structures, partitioning, pipelining; vector processing; multiprocessing; and case studies.
731. **ADVANCED TOPICS IN COMPUTER ARCHITECTURE (3).** Pr., EE 530 or equivalent. Current topics in the field of computer architecture, with emphasis varying according to current research interests. May be taken more than one quarter.
732. **DESIGN AND ANALYSIS OF COMPUTER NETWORKS (3).** Pr., EE 532 or equivalent. Layered communication architectures, SNA and X.25 protocol, performance evaluation of communication networks and systems using queueing theory, design and analysis of packet switching and circuit switching networks, principles of integrated services digital networks (ISDNs).
733. **THEORY OF CONCURRENT SYSTEMS (3).** Pr., EE 533 or equivalent. The theory of concurrent computer architectures and research in multiple processor computing environments.
734. **DISTRIBUTED DATA PROCESSING II (3).** Pr., EE 534 or equivalent, or COI. Advanced topics in distributed data processing, including decentralized control and distributed operating systems, fault tolerance techniques for distributed systems, dynamic reconfiguration of resources, and application of distributed networks.
735. **FAULT TOLERANT COMPUTING (4).** Pr., EE 530 or equivalent, or COI. Architecture and design of fault tolerant computer systems using protective redundancy, estimation of the reliability and availability of fault tolerant systems, error recovery, and fault diagnosis.
741. **SPECTRAL ANALYSIS AND OPTIMUM FILTERING (3).** Pr., EE 702. Noise processes, correlation, power spectra, noise through linear system, matched filters, Wiener filters, pre-whitening, and parameter optimization.
743. **COMMUNICATION SYSTEMS (3).** Pr., COI. RF circuitry; impedance matching networks; oscillators; mixers; modulators; detectors; RF amplifiers; high frequency devices; integrated subsystems; testing and measuring techniques in RF systems.
747. **THEORY OF DIGITAL SIGNAL PROCESSING (3).** Pr., EE 547. Finite and infinite impulse response digital filters, finite word length effects, two dimensional signal processing hardware schemes and application.
- 748-749. **DETECTION, ESTIMATION, AND MODULATION THEORY I-II (3-3).** Pr., EE 741 or COI. Hypothesis testing, parameter estimation, detection and estimation of parameters in Gaussian noise, linear estimation, optimum demodulation.

750. **STATE VARIABLE ANALYSIS OF SYSTEMS (4).** Pr., COI. Matrices and linear spaces; state variables for linear continuous systems; applications in analysis and design of control systems.
751. **DIGITAL CONTROL SYSTEMS (4).** Pr., COI. State variable description for discrete systems; analysis of digital control systems; design by classical methods.
752. **NONLINEAR CONTROL SYSTEMS (4).** Pr., COI. State plane; describing functions; Lyapunov methods.
753. **OPTIMAL CONTROL SYSTEMS (4).** Pr., COI. Theory of extrema, calculus of variation, LQR theory, optimal control, observability, controllability, sensitivity, observers, pole assignments.
754. **STOCHASTIC CONTROL SYSTEMS II (4).** Pr., EE 654, COI. Principles of optimality, linear and nonlinear stochastic systems, cost functions, LQR, LQG.
755. **MODERN CONTROL THEORY APPLICATIONS (4).** Pr., COI. Advanced practical aspects of optimal control and estimation theory.
770. **ADVANCED BIPOLAR DEVICES (3).** Pr., EE 571 or COI. Advanced physical theory of pn junctions and bipolar junction transistors, modeling theory, high level injection effects, large signal analysis, and second order effects.
771. **ADVANCED UNIPOLAR DEVICES (3).** Pr., COI. Advanced theory of field effect devices.
772. **COMPOUND SEMICONDUCTOR ELECTRONICS (3).** Pr., COI. Compound semiconductor materials properties, heterojunction structures and bandgap engineering, metal-semiconductor interfaces, two dimensional electron gas, compound semiconductor devices; compound semiconductor circuits, IC fabrication.
773. **ADVANCED FABRICATION PROCESSES AND LABORATORY (4).** LEC. 3, LAB. 3. Pr., EE 672 or COI. Physics of semiconductor processing: vacuum technology, diffusion, implantation, photolithography. Design and fabrication of polysilicon self-aligned gate arrays and advanced bipolar devices. Process control defect distribution, statistical yield analysis, quality control and reliability considerations.
774. **QUANTUM ELECTRONICS (3).** Pr., EE 674, PS 643. Quantized electromagnetic fields, interaction of radiation and atomic systems, laser oscillation, semiconductor lasers, parametric amplification, phase conjugate optics.
775. **ADVANCED TOPICS IN ELECTRONIC CIRCUIT DESIGN (3).** Pr., COI. The material for this course will be chosen from recent advances in electronic circuit design. Since the topics may be different each time offered, this course may be taken more than one quarter.
776. **VLSI DESIGN (3).** Pr., EE 676 or COI. May be taken more than once for credit. Course will normally span at least two quarters. Analysis, design, simulation and layout of very large scale integrated circuits, comparison of logic families, design for testability, design tools including SPICE, RNL, VHDL, MAGIC, etc., group projects include the complete design of a VLSI circuit.
778. **MATERIALS AND DEVICE CHARACTERIZATION (3).** Pr., EE 572, 671. Familiarization and case studies of principles and applications of analytical techniques that determine the physical composition, structure, and electronic properties of modern solid-state microelectronic materials and devices. Review techniques for determining resistivity, dielectric constant, mobility, doping profiles, defects, structure and composition.
779. **ADVANCED PLASMA PROCESSING OF ELECTRONIC MATERIALS (3).** Pr., COI. Analysis, design, and application of DC, RF and microwave plasmas in microelectronic materials processing, sputtering, etching, deposition, surface modification; diagnostic and characterization techniques.
781. **GENERALIZED MACHINE THEORY (3).** Pr., EE 481 or COI. Linear coordinate transformations. The generalized machine. Dynamic and steady state performance.
785. **POWER SYSTEM TRANSIENTS (3).** Pr., EE 385 or COI. Derivation of line parameters, including ground effects and overhead neutrals. @, D, O components. Line performance including lightning and switching transients. Surge arrester applications.
787. **POWER SYSTEM OPERATIONS (3).** Pr., EE 587 or COI. State estimation, observability, contingency screening, optimal power flow, short-term load forecast, unit commitment.
788. **POWER SYSTEM STABILITY (3).** Pr., EE 385 or COI. Definitions of steady state, dynamic, and transient stability. H constants. The swing equation. Synchronous models. Multimachine systems.
790. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
792. **DIRECTED READING IN ELECTRICAL ENGINEERING (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
795. **SEMINAR (CREDIT TO BE ARRANGED.)** Pr., COI. May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Engineering (EGR)

General Curriculum (GC) students (those with undeclared majors) may enroll only with departmental consent. For other engineering courses, refer to individual departmental course offerings.

205. **ENGINEERING MECHANICS — STATICS (4).** Pr., PS 220. Coreq., MH 264. Basic principles of statics. Free body concepts. Parallel, concurrent, and non-current force systems, coplanar and non-coplanar. Friction, centroids, and moments of inertia.
207. **MECHANICS OF SOLIDS (4).** LEC. 3, LAB. 3. Pr., EGR 205, MH 264. Coreq. MH 265. Principles of strength of materials; equilibrium, compatibility, and properties of materials. Stress and strain at a point, Stress-strain-temperature relations. Simple application of stress and deformation analysis to axially and biaxially loaded structures, as well as flexural and torsional loading.

420. **PROFESSIONAL PRACTICE IN ENGINEERING (1). LEC. 1. (S-U graded.)** Pr., Upper division standing. Professional engineering attitudes, ethics, and social responsibilities.
450. **ENGINEERING HONORS (1).** May be taken for no more than two quarters. Pr., junior standing. Open to Honors Program students only.
491. **LEGAL ASPECTS OF ENGINEERING, ARCHITECTURE AND DESIGN (3).** Legal aspects of engineering and design; an introduction to the American legal system with emphasis on problems of the engineering and design professions.

English (EH)

Professors Hitchcock, Head, Jacobson, Latimer, Littleton, Morrow, Rygiel, Solomon, Welt, and T. Wright

Associate Professors Clark, Gresham, Hammersmith, Kouidis, Rose, Smith, and Thompson
 Assistant Professors Brown, Burling, Clark, Daron, Driggers, Dunlop, LaPointe, Nunnally, Rothschild, St. John, VanGastel, Wehrs, Werner, and R. Wright
 Instructors Bancroft, Bishop, Buccleugh, Crandell, Crofton, Cunningham, Curry, Ellis, Fletcher, Fry, Garrett, Gaston, Graney, Green, Helten, Herring, Huggins, Hyles, Kaetz, Pellikka, Regier, Register, Roberson, Scogan, Stuart, Vaughn, L. Ward, S. Ward, Waters, Whalen, Williford, Worthington, D. Wright, and J. Wright

The requirements for English majors enrolled in the College of Liberal Arts are stated on page 135; requirements for English majors enrolled in the College of Education are stated on pages 79-80.

English Composition (101-102-103 or 105-106) is required of all students and is a prerequisite for all other courses in English.

Most 300 through 600-level five-hour EH courses are offered in alternate years rather than annually. An exact schedule of course offerings is available in the English Department office.

I. GENERAL CURRICULUM COURSES

100. **BASIC ENGLISH (NO CREDIT).** All quarters. English grammar and mechanics and fundamentals of composition. Recommended for students with poor composition backgrounds or for students whose ACT or SAT verbal scores are low.
- 101-102-103. **ENGLISH COMPOSITION (3-3-3).** EH 101 pr. for 102; 102 pr. for 103. All quarters. The essentials of composition and rhetoric. Reading of selected essays, fiction, poems, and plays.
- 105-106. **HONORS ENGLISH (3-3).** EH 105, Summer, Fall; 106, Fall, Winter. Reading and composition for superior students. Students earning a C or better final grade in both courses will receive an additional three hours of credit. The student who fails to earn at least a C changes to the regular sequence (EH 101-102-103) and completes a total of three courses. Departmental approval required for admission to this sequence.
141. **MEDICAL VOCABULARY (3).** Fall, Winter, Spring. Prefixes, suffixes, and the more common root words of medical terminology.
- 250-251. **HONORS SURVEY OF ENGLISH LITERATURE (5-5).** EH 250 rec. before 251. English literature from *Beowulf* to the present. An optional alternative to EH 253-254-255 for students with a B or better average in Freshman English.
- 253-254-255. **SURVEY OF ENGLISH LITERATURE (3-3-3).** All quarters. Courses to be taken in sequence. English literature from *Beowulf* to the present.
- 260-261-262. **SURVEY OF LITERATURE OF THE WESTERN WORLD (3-3-3).** All quarters. Courses to be taken in sequence. Master works from Homer to Faulkner: EH 260, the classical period; EH 261, medieval through eighteenth century; EH 262, nineteenth and twentieth centuries.
- 270-271-272. **SURVEY OF AMERICAN LITERATURE (3-3-3).** All quarters. Courses to be taken in sequence. EH 270, beginnings to mid-nineteenth century; 271, later nineteenth and early twentieth centuries; 272, twentieth century.

II. ENGLISH LITERATURE

405. **CHAUCEER (5).** The major works of Chaucer in Middle English.
406. **MEDIEVAL ENGLISH LITERATURE (5).** This course concentrates on *Le Morte d'Arthur*, *Sir Gawain and the Green Knight*, *Pearl*, medieval drama, and the Middle English lyric.
450. **MODERN BRITISH LITERATURE (5).** British poetry and prose, 1910-1945.
452. **CONTEMPORARY BRITISH LITERATURE (5).** British poetry and prose, 1945-present.
454. **SEMINAR IN LITERARY TOPICS (5).*** Concentrated investigation of major figures in varying literary fields.
461. **ENGLISH DRAMA, BEGINNINGS TO 1642 (5).**
462. **POETRY AND PROSE OF THE ENGLISH RENAISSANCE, 1475-1603 (5).**
463. **RESTORATION AND NEO-CLASSICAL LITERATURE, 1660-1745 (5).**
464. **THE AGE OF JOHNSON, 1745-1798 (5).** Poetry, prose, and drama.

465. **MILTON (5).**
466. **POETRY AND PROSE OF THE SEVENTEENTH CENTURY (5).** Non-dramatic British literature, 1603-1660.
469. **EIGHTEENTH-CENTURY ENGLISH NOVEL (5).**
470. **EARLY SHAKESPEARE (5).** The Comedies, Histories, and Early Tragedies. Credit for this course precludes credit for EH 350.
471. **LATER SHAKESPEARE (5).** Tragedies, Dark Comedies, and Romances. Credit for this course precludes credit for EH 350.
474. **NINETEENTH-CENTURY ENGLISH NOVEL (5).**
475. **ROMANTIC LITERATURE, 1790-1830 (5).** Poetry and prose from Wordsworth through Keats.
477. **VICTORIAN LITERATURE, 1830-1890 (5).** The major poets and nonfiction writers from 1830 to 1890.
479. **HONORS THESIS (3).*** For Honors Program students. Repeatable once.
- 498-499. **READINGS FOR HONORS (5-5).*** Pr., junior standing with a minimum of 3.0 overall average, a 3.5 average in at least five upper division English courses, and the consent of the English Department. Individual reading programs in a specific period or phase of literature or language, as determined by the instructor and student. An honors essay and a written examination will be required.
525. **SPECIAL TOPICS SEMINAR (3-5).***

III. AMERICAN LITERATURE

425. **THE SHORT STORY (5).** The development of the short story in America and Europe from the early nineteenth century to the present.
440. **EARLY AMERICAN LITERATURE (5).** American literature to 1800.
441. **AMERICAN ROMANTICISM (5).** Nineteenth-century American literature to approximately 1865.
442. **AMERICAN REALISM AND NATURALISM (5).** American literature of the later nineteenth and early twentieth centuries.
443. **MODERN AMERICAN LITERATURE (5).** American poetry and prose, 1914-1945.
444. **CONTEMPORARY AMERICAN LITERATURE (5).** American poetry and prose, 1945-present.
472. **THE AMERICAN NOVEL (5).**
473. **AMERICAN POETRY (5).** Major American poets from the colonial period to the present.
495. **SOUTHERN LITERATURE (5).** The poetry, fiction, and nonfiction prose writings in the South from Revolutionary times to the present, with major emphasis centering on Southern regional attitudes and trends. Credit for this course precludes credit for EH 365.

IV. LITERATURE IN TRANSLATION

335. **CLASSICAL MYTHOLOGY (3).** The character and influence of Greek and Roman mythology.
412. **THE EUROPEAN NOVEL (5).** The reading and analysis of significant novels by major European writers.
430. **THE CLASSICAL BACKGROUND (5).** Readings from the major Greek and Roman writers. The texts studied are chosen with particular attention to their subsequent influence upon English and American literature.
435. **CONTEMPORARY DRAMA (5).** Continental, British, and American dramatists from Ibsen to the present.
490. **STUDIES IN COMPARATIVE LITERATURE (5).** Non-British and non-American literature written in English or studied in translation.

V. LANGUAGE AND LINGUISTICS

410. **CONTEMPORARY RHETORIC (5).** The principles of rhetorical analysis and of modern stylistics with practical application of those principles to varied types of literary materials.
411. **INTRODUCTION TO LINGUISTICS (5).** A broad survey of the system and structure of modern American English (sounds, words, syntax, meaning) as well as developments in special areas of English linguistics, including the neurology and psychology of language, animal communication, and regional and social dialectology.
481. **SURVEY OF CRITICAL THEORY (5).**
541. **HISTORY OF THE ENGLISH LANGUAGE (5).** The chronological development of the English language.
594. **MODERN ENGLISH GRAMMARS (5).** Modern methods of language study, with particular emphasis on English syntax and semantics.

*May be taken in Categories II-VI.

VI. WRITING COURSES

400. **ADVANCED COMPOSITION (5).** All quarters. The practice and theory of expository writing; the command of language for the clear and forceful communication of ideas.
420. **INTRODUCTORY FICTION WRITING (5).**

- 421. **ADVANCED FICTION WRITING (5).** Pr., EH 420.
- 427. **INTRODUCTORY POETRY WRITING (5).**
- 428. **ADVANCED POETRY WRITING (5).** Pr., EH 427.
- 429. **SPECIAL PROJECT IN CREATIVE WRITING (5).** Pr., EH 420 or 427. Extensive writing in varying literary genres, the specific kind of writing to be announced each time the course is offered. Course may be repeated once for credit, with instructor's and department's consent.

VII. COURSES ON SPECIAL TOPICS

- 310. **WORD STUDY (3).** A general, broad-based exploration of the lexical component of the English language.
- 319. **STUDIES IN CHILDREN'S LITERATURE (3).**
- 350. **SHAKESPEARE'S GREATEST PLAYS (3).** Some of Shakespeare's masterpieces. Credit for EH 470 or 471 precludes credit for this course.
- 365. **SOUTHERN LITERATURE (3).** Credit for EH 495 precludes credit for this course.
- 373. **SCIENCE FICTION (3).** Representative science fiction from the nineteenth century to the present.
- 374. **THE GOTHIC NOVEL (3).**
- 382. **POPULAR LITERATURE (3).** A study of various types of formula literature such as the detective story and the Western, and of the techniques of popular fictional writing.
- 383. **WOMEN IN LITERATURE (3).**
- 384. **LITERATURE AND CULTURE (3).**
- 385. **RECENT FICTION (3).** The reading and discussion of selected examples of the New Fiction.
- 386. **CONTEMPORARY PROSE (3).** Recent nonfiction prose works noteworthy for their style and content.
- 387. **WORLD ENGLISH LITERATURES (3).** Studies in non-British and non-American literature written in English.
- 388. **STUDIES IN COMEDY (3).**
- 401. **INTRODUCTION TO LITERARY ANALYSIS (3).** Pr., one English course in literature at the sophomore level or above. Fundamental terminology and strategies for the analysis of all aspects of literature; reading and writing.
- 402. **STRUCTURES OF LITERATURE (3).** Pr., EH 401. The analysis of literature and the writing of analytical prose; emphasis on specific structures of different kinds of literary art.

GRADUATE

- 601. **INTRODUCTION TO THE TEACHING OF FRESHMAN ENGLISH (3).**
- 604. **ENGLISH COMPOSITION: APPROACHES AND ISSUES (5).**
- 613. **FICTION WRITING (5).** Pr., COL. Repeatable for a total of 10 hours credit.
- 614. **POETRY WRITING (5).** Pr., COL. Repeatable for a total of 10 hours credit.
- 620. **OLD ENGLISH (5).**
- 621. **STUDIES IN MEDIEVAL LITERATURE (5).**
- 623. **BEOWULF (5).** Pr., EH 620.
- 625. **MEDIEVAL LITERATURE (5).**
- 626. **CHAUCE (5).**
- 627. **THE STRUCTURE OF ENGLISH (5).**
- 628. **STUDIES IN LINGUISTICS (5).** Pr., EH 411, 627, or an equivalent course.
- 629. **STYLISTICS (5).**
- 631. **ELIZABETHAN AND JACOBAN DRAMA (5).**
- 632. **SPENSER (5).**
- 633. **STUDIES IN THE POETRY AND PROSE OF THE ENGLISH RENAISSANCE (5).**
- 634. **POETRY AND PROSE OF THE SEVENTEENTH CENTURY (5).**
- 635. **STUDIES IN SHAKESPEARE (5).**
- 636. **MILTON (5).**
- 640. **RESTORATION AND EIGHTEENTH-CENTURY ENGLISH DRAMA (5).**
- 641. **STUDIES IN THE AGE OF POPE (5).**
- 642. **STUDIES IN THE AGE OF JOHNSON (5).**
- 644. **STUDIES IN THE EIGHTEENTH-CENTURY ENGLISH NOVEL (5).**
- 650. **STUDIES IN ENGLISH ROMANTICISM (5).**

- 652. **STUDIES IN VICTORIAN LITERATURE (5).**
- 654. **STUDIES IN THE NINETEENTH-CENTURY ENGLISH NOVEL (5).**
- 660. **MODERN POETRY (5).**
- 661. **MODERN FICTION (5).**
- 662. **STUDIES IN TWENTIETH-CENTURY LITERATURE (5).**
- 663. **STUDIES IN MODERN DRAMA (5).**
- 670. **AMERICAN LITERATURE OF THE COLONIAL AND REVOLUTIONARY PERIODS (5).**
- 671. **STUDIES IN AMERICAN LITERATURE, 1800-1860 (5).**
- 672. **STUDIES IN AMERICAN LITERATURE, 1860-1914 (5).**
- 673. **STUDIES IN THE LITERATURE OF THE SOUTH (5).**
- 680. **CONTEMPORARY CRITICAL THEORY (5).**
- 684. **DIRECTED INDIVIDUAL STUDY (Variable credit).** (May be repeated up to 10 hrs. of credit.)
- 690. **STUDIES IN COMPARATIVE LITERATURE (5).**
- 699. **RESEARCH AND THESIS.**
- 799. **RESEARCH AND DISSERTATION.**

ENGLISH — APPLIED WRITING (EHA)

- 304. **TECHNICAL WRITING (3).** All quarters. Practical writing, especially correspondence and reports, for students in scientific and technical fields. Credit for EHA 315 precludes credit for this course.
- 307. **CRIMINAL JUSTICE REPORT WRITING (3).** Fall, Spring. Report and correspondence writing for students in criminal justice fields.
- 315. **BUSINESS AND PROFESSIONAL REPORT WRITING (3).** All quarters. The writing of formal and informal business reports with emphasis on design, organization, research, and presentation.
- 415. **WRITTEN BUSINESS COMMUNICATIONS (3).** Pr., EHA 315, for curricula requiring EHA 315 and 415. All quarters. Application of semantics, communication theory, human relations, and rhetorical techniques to written business communications; practice in expository and persuasive writing.
- 416. **APPLIED WRITING AND EDITING (3).** Winter. An advanced course designed to develop skills in writing and editing documents common in business and industry; emphasis on preparing house organs, proposals, brochures, position papers, and annual reports.
- 501. **ADVANCED PROFESSIONAL WRITING (5).** Pr., COI. Document design, readability, graphics, audience analysis in advanced professional and technical writing tasks.
- 502. **PRACTICUM IN PROFESSIONAL WRITING (5).** Pr., COI. Supervised experience in editing technical, business, and scientific documents.
- 602. **THE PEDAGOGY OF BUSINESS AND TECHNICAL WRITING (5).** Pr., CTS 502 or EH 604 or equivalent. Methods, practices, and theories of business and technical communication courses for prospective instructors.

Entomology (ENT)

Professors Brewer, Head, and Berger
Associate Professors Clark, Gaylor, Hyche, Kouskolekas,
Mack, Mullen, and Williams
Assistant Professors Appel, Cane, and Estes
Extension Specialists Brown, Cobb, Dennis, French, Freeman,
McVay, Smith, Strother, and Weeks

- 204. **INSECTS (3).** LEC. 3. Fall, Winter, and Spring. Life processes, occurrence, and importance of insects.
- 209. **BEE BIOLOGY (3).** LEC. 3. Winter. Principles of ecology, behavior, physiology, and genetics will be used to understand the biology of bees and their ecological roles in pollination.
- 210. **APICULTURE (2).** LAB. 4. Pr., ENT 209. Spring. Apply knowledge of honey bee biology to the care and management of small apiaries for the production of honey and wax and for commercial pollination.
- 215. **FOREST PESTS (4).** LEC. 3, LAB. 1. Pr., BI 101-102. Spring. Diseases and pests of forest and shade trees from seedling to maturity. Pest damage to wood products will also be discussed. Field trip will emphasize major forest pest problems in Alabama.
- 304. **GENERAL ENTOMOLOGY (5).** LEC. 4, LAB. 3. Pr., BI 103. Fall, Spring. Introduction to the biology and diversity of insects.
- 305. **FOREST ENTOMOLOGY (3).** LEC. 2, LAB. 3. Pr., BI 103. Fall. Entomology in relation to insects of forests and forest products; recognition, life histories, and control of major insects of forests. Forestry students only.

404. **INSECTS AFFECTING MAN AND ANIMALS (5). LEC. 4, LAB. 3.** Fall. Surveys insects, mites, ticks, spiders and other arthropods which attack man and domestic animals. Emphasis is given to recognition of pest species, their biology, and role in transmitting disease agents of veterinary or public health importance.
405. **APPLIED ENTOMOLOGY (5). LEC. 4, LAB. 3. Pr., ENT 200.** Spring. Biology, economic importance and management of the more important insect pests in each of the various agricultural commodity groups.
406. **ALTERNATIVE METHODS OF INSECT PEST MANAGEMENT (5). LEC. 3. Pr., ENT 405.** Fall. An introduction to insect management tactics other than chemical insecticides.
491. **ENTOMOLOGY INTERNSHIP (UP TO 5 HRS. PER QUARTER, 15 HRS. MAXIMUM.) COI, SU graded.** Provides practical job experience under joint supervision of the Internship adviser and appropriate state, federal, or private agency. Training will prepare student for potential career employment.
498. **SPECIAL PROBLEMS OR TOPICS (1-3). Pr., senior standing.** A student can register for a total of not more than three hours credit.

ADVANCED UNDERGRADUATE AND GRADUATE

502. **ECONOMIC ENTOMOLOGY (5). LEC. 4, LAB. 3.** Fall, Spring. Consideration of the biological aspects, life histories, and control of insects. Not for graduate credit for students in College of Agriculture departments.
503. **TOXICOLOGY OF INSECTICIDES (5). LEC. 4, LAB. 3.** Winter. Toxic actions of insecticides; formulations, application methods and uses of insecticides; research methods and uses of insecticides; research methods in insect toxicology; insecticide residues in relation to man and the environment.
505. **FOREST INSECTS (5). LEC. 4, LAB. 3. Pr., ENT 200, ENT 305 or ENT 502.** Spring, even years. Principal insects of forests and forest products; their importance, taxonomy, bionomics, and control.
514. **AQUATIC INSECT BIOLOGY (5). LEC. 3, LAB. 6. Pr., ENT 200.** Fall. Ecology, systematics, and identification of aquatic and semiaquatic insects. Some emphasis will be placed on groups of significance in food webs or of value as indicator organisms. A collection will be required. Some weekend field trips will be taken.

GRADUATE

602. **CHEMICAL ECOLOGY (5). LEC. 5. Pr., CH 207 (5 qtr. hrs.) or general ecology (5 qtr. hrs.) or COI.** Winter, odd years. Chemical mediation of biotic interactions between organisms and their environment.
606. **IMMATURE FORMS OF INSECTS (5). LEC. 2, LAB. 6. Pr., ENT 200.** Winter. Structure and identification of immature forms of insects: methods of collecting and preserving; development and use of keys for classifying immature insects.
607. **GENERAL INSECT MORPHOLOGY (5). LEC. 3, LAB. 6. Pr., ENT 200.** Winter. Comparative external anatomy and generalized internal structures of insects; characteristics used in taxonomy will be emphasized.
608. **URBAN ENTOMOLOGY (5). LEC. 3, LAB. 6.** Fall. Pr., ENT 200 or equivalent. Identification, biology and control of insect and other household arthropod pests.
610. **SYSTEMATIC ENTOMOLOGY (5). LEC. 3, LAB. 6. Pr., ENT 200.** Spring. Principles of systematics and identification of insects through orders, families, genera, and species.
611. **PRINCIPLES OF SYSTEMATIC ZOOLOGY (5). LEC. 5. Pr., ZY 303.** Winter, odd years. Theoretical, philosophical and practical problems in the recognition of species, determination of their phylogenetic relationships and their classification.
625. **MEDICAL-VETERINARY ENTOMOLOGY (5). LEC. 4, LAB. 3. Pr., ENT 200.** Fall, even years. Insects, mites, and other arthropods of medical and veterinary importance with emphasis on identification of pest species, their biology, and role in epidemiology of arthropod-borne diseases.
693. **SEMINAR (CREDIT TO BE ARRANGED.) REQUIRED OF ALL MASTER OF SCIENCE CANDIDATES.**
698. **SPECIAL PROBLEMS AND TOPICS (2-5).** All quarters. Consult individual faculty member before registering.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
701. **ADVANCED INSECT MORPHOLOGY AND DEVELOPMENT (5). LEC. 3, LAB. 6. Pr., ENT 607.** Fall, odd years. A comparative study of selected arthropod structures and a consideration of embryological development and metamorphosis in insects.
703. **INSECT PHYSIOLOGY (5). LEC. 3, LAB. 6. Pr., ZY 524 and ENT 701.** Spring, even years. General and comparative physiology of the organ systems of insects. A minimum of two literature reviews will be made by each student during the quarter.
709. **ADVANCED INSECT MANAGEMENT (5). LEC. 5. Pr., ZY 306 or equivalent.** Fall, even years. Integrated control of the principal insects by environmental, biological, genetic, chemical, and legal means.
712. **ADVANCED INSECT TOXICOLOGY (5). LEC. 4, LAB. 3. Pr., CH 518.** Spring, odd years. Mode of action, mode of entry, relation of chemical structure to toxicity, and precision methods of determination of insecticides; recent developments in the field of insecticide chemistry.
713. **INSECT PATHOLOGY (5). LEC. 3, LAB. 4. Pr., MB 300, ENT 200, or equivalent and COI.** Spring, even years. The micro-organisms associated with diseases in insects and their pathological effects on insects and insect populations.
714. **BIOLOGICAL CONTROL OF INSECTS (5). LEC. 4, LAB. 3. Pr., ENT 200 and ZY 306 or equivalent and COI.** Spring, odd years. Biology, ecology, classification, and behavior of predators, parasites, and disease agents influencing insect populations. Utilization of biotic agents for management of pest populations.

715. **POPULATION DYNAMICS AND MODELLING FOR BIOLOGISTS (5).** LEC. 3, LAB. 6. Pr., ZY 306 or its equivalent and a working knowledge of a programming language. Spring. Quantitative methods for analyzing the population dynamics of organisms; also an introduction to design, construction, and evaluation of deterministic simulation models.
720. **ARACHNOLOGY (5).** LEC. 3, LAB. 6. Pr., ENT 200. Fall, odd years. Biology, behavior, and systematics of arachnids with major emphasis on spiders and mites.
793. **SEMINAR (CREDIT TO BE ARRANGED.) REQUIRED OF ALL MASTER OF SCIENCE CANDIDATES.**
798. **SPECIAL PROBLEMS OR TOPICS (1-5).** Pr., Ph.D. standing. Special research projects or study topics directed by individual faculty member. Consult faculty member before registering.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Environmental Science (EHS)

For information on this program refer to the description of the curriculum in the Interdepartmental curricula section of the Bulletin.

Family and Child Development (FCD)

Professors Avery, Bradbard, Head, Henton, and Vaughn

Associate Professors Lamke, Lindholm, Salts, and Sollie

Assistant Professors Allgood, Britt, Duncan, Giles, Mize, C. Smith, T. Smith, and Waters

Instructors Grover and Silvern

157. **FAMILY AND HUMAN DEVELOPMENT (3).** Human development as it is affected by the family and the family as it affects and is affected by the environment. Prior credit for any other Family and Child Development course precludes credit for this course for majors only.
267. **HUMAN DEVELOPMENT I: PRINCIPLES & THEORIES (4).** Introduction to the principles and theories of human development.
269. **FAMILY I: MATE SELECTION AND MARITAL INTERACTION (4).** Analysis of courtship, mate selection, and marital interaction. Factors contributing to marital stability and success.
270. **FAMILY II: STRUCTURE AND FUNCTION OF THE FAMILY (4).** Introduction to the structure and function of the family, its interaction with other societal institutions, and the effects on all family members.
280. **HUMAN DEVELOPMENT II: INFANCY (4).** Pr., FCD 267 or COI. Winter. Intensive study of physical, cognitive, and psycho-social aspects of development from conception to age two. Lab experiences may be arranged.
287. **CAREERS IN FAMILY AND CHILD DEVELOPMENT (2).** Introduces students to the range of career choices in the field of family and child development and the preparation needed to qualify for them. Includes orientation to the Department.
300. **APPROACHES TO CHILD STUDY (4).** LEC. 3, LAB. 2. Pr., FCD 267, 270. Principles and techniques of studying children and their families. Directed observation experiences are arranged in the Child Study Center.
301. **HUMAN DEVELOPMENT III: EARLY AND MIDDLE CHILDHOOD DEVELOPMENT (5).** LEC. 4, LAB. 2. Pr., FCD 267 or 270. Physical, intellectual, social, and emotional development of children from early through middle childhood: familial influences on development and behavior. Laboratory experiences are required.
302. **HUMAN DEVELOPMENT IV: ADOLESCENCE AND EARLY ADULTHOOD (4).** Pr., FCD 267, 270, and junior standing. A study of the individual from adolescence through early adulthood, emphasizing familial influence on development and behavior. Field assignments are required.
304. **HUMAN SEXUALITY THROUGHOUT THE FAMILY LIFE CYCLE (4).** Pr., SY 201 and PG 211 or 213, junior standing. Human sexuality from a life cycle perspective, with emphasis on developmental, familial, and societal factors that influence individual sexuality.
306. **FAMILY III: PATTERNS OF FAMILY INTERACTION (4).** Pr., FCD 270. Current theories of family interaction including normal and deviant patterns and other effects.
308. **FAMILY IV: RELATIONSHIP COMPETENCE (3).** Pr., 269. An empirical examination of the interpersonal competencies necessary for the development of successful dating and marital relationships.
309. **INTRODUCTION TO MARRIAGE AND FAMILY THERAPY (4).** Pr., FCD 270 or COI. A broad overview of the history, theory and application of marriage and family therapy.
310. **TECHNIQUES OF CHILD AND FAMILY INTERVIEWING (4).** Pr., COI. Principles and techniques of interviewing and establishing a helping relationship with children and families.
330. **LIFESPAN HUMAN DEVELOPMENT (5).** Pr., FCD 157, or 270 or PG 211 or SY 301 or COI. A survey of the basic theories and empirical data related to the process of human development from conception to death, with focus on practical implications. Laboratory experiences required. This course is designed primarily for Nursing and Vocational Home Economics students. Not open to FCD majors.
347. **LABORATORY EXPERIENCES WITH YOUNG CHILDREN (3).** LEC. 1, LAB. 6. Pr., FCD 267, 270, 300, 301. Substantive lecture material and supervised participation in the Child Study Center preschool programs. (Required of all FCD majors.)

350. **DAY CARE FOR CHILDREN (4).** Pr., FCD 267, 301, junior standing, or COI. An historical and theoretical study of day care with discussion of multi-cultural programs, licensing standards, and various patterns of group and family day care service. Field assignment required.
358. **LEARNING EXPERIENCES FOR YOUNG CHILDREN (6).** LEC. 4, LAB 6. Pr., FCD 300, 301, 347, or COI. Theoretical foundations and practical applications of programs and activities for young children.
399. **EXPERIENTIAL LEARNING (1-6).** TBA. COI. Independent work experience arranged. A. Child Study Center; B. Other approved placements. May be taken more than once. Total credit not to exceed 6 hours.
409. **UNDERGRADUATE RESEARCH AND STUDY. (CREDIT TO BE ARRANGED.) (1-5).** May be repeated for a maximum of 5 credits. Pr., departmental approval of written application. All quarters. Consent for enrollment is based on a written proposal outlining the proposed course of study. Students should consult the department for further information and approval forms.
410. **DIRECTED READING IN FAMILY AND CHILD DEVELOPMENT. (CREDIT TO BE ARRANGED.) (1-3).** Pr., COI. May be repeated for a maximum of 3 credits.
420. **RECENT RESEARCH IN CHILD DEVELOPMENT (4).** Pr., FCD 267, 270. Synthesis of recent research in child development with particular emphasis on studies dealing with family influences on children.
438. **STUDY/TRAVEL IN FAMILY AND CHILD DEVELOPMENT (2-8).** Pr., junior standing and COI. Course may be repeated for a maximum of 12 undergraduate credit. Concentrated study of family and child development in foreign locations aimed at greater understanding of the dynamics of child development and patterns of family life. Lectures presented at prearranged points. Papers required on selected phases of the course.
467. **PARENT EDUCATION (4).** Pr., FCD 270. The principles of working with parents on both an individual and group basis. Laboratory experiences may be arranged.
477. **HUMAN DEVELOPMENT V: FAMILY AND AGING (3).** Pr., FCD 270. The interactive nature of the aging process as it relates to the family and its older members with emphasis upon the problems of health, finances, housing, and leisure time. Laboratory experiences provided.
497. **INTERNSHIP (5-15 HOURS IN A, B, C, D, E, OR F).** Pr., Students must have a 2.0 GPA in all required FCD courses to enroll. No more than three (3) options may be taken for a total of twenty (20) credits. A. Social Services; B. Family and Child Development; C. Maternal and Child Health; D. Day Care; E. Parent Education; F. Aged. Internship arranged on individual basis, supervised by faculty in community agencies, hospitals, clinics, Child Study and Marriage and Family Therapy Centers.
499. **SEMINAR (2).** Pr., FCD 497 or COI.

ADVANCED UNDERGRADUATE AND GRADUATE

547. **ADMINISTRATION OF PROGRAMS FOR CHILDREN AND FAMILIES (3).** Pr., senior standing in the major or related field, FCD 270, 301, or equivalents. Essential procedures for implementing programs for children and/or families. Topics include housing and equipment, finances and record-keeping, nutrition and health, staffing, and community relations.
550. **HOSPITALIZED CHILDREN AND THEIR FAMILIES (5).** LEC. 4, LAB. 2. Pr., senior standing in the major or related field, FCD 270, 301, or equivalents. Theoretical principles and practical applications of child life programming as it relates to the psychosocial needs of hospitalized children and their families.
568. **GENDER ROLES AND CLOSE RELATIONSHIPS (3).** Pr., FCD 270 or equivalent. A critical analysis of women's and men's changing roles in society. Effects of these changes on relationship development, marriage, and the family.

GRADUATE

609. **SPECIAL PROBLEMS (1-5).** Pr., COI. and approval of written application by major professor. May be taken for more than one quarter. Not to exceed 5 hours of credit toward the minimum of 48 for the M.S. degree. All quarters. A. Family Relations; B. Child Development; C. Marriage and Family Therapy; D. Parent Education.
610. **THEORIES OF HUMAN DEVELOPMENT (4).** Pr., FCD 267 or equivalent. Cognitive, personal, and social development from birth through maturity and old age, with special attention to the influence of the family on the individual.
611. **ADVANCED CHILD DEVELOPMENT (4).** Pr., FCD 610 or COI. Advanced study of theoretical and empirical material regarding child development from conception through adolescence, with emphasis on physical and cognitive development.
616. **SOCIAL DEVELOPMENT OF CHILDREN (4).** Pr., FCD 611 or COI. Theory and research related to the acquisition of social behavior by children.
618. **DAY CARE AND THE FAMILY: RESEARCH AND ISSUES (4).** Pr., FCD 611 or COI. Research and issues concerning the impact of day care on the family unit and children's social, emotional, and cognitive development.
620. **MARITAL AND FAMILY SYSTEMS (5).** LEC. 4, LAB. 1. Pr., SY 301, FCD 270 or 610, or COI. Intensive study and application of the systems approach to the understanding of family interaction and family problems.
621. **PARENT-CHILD INTERACTION (4).** Pr., FCD 270, 610 or COI. Discussion of parent-child interactions and evaluation of relevant research literature.
622. **DYSFUNCTIONS IN MARRIAGE AND FAMILY (4).** Pr., FCD 620. The dynamics and assessment of common dysfunctions in marital and family relationships based on current theory and research.
623. **RESEARCH METHODS FOR CHILD AND FAMILY STUDY (4).** Pr., FCD 610 or COI. Survey of principles and methods for the study of children and their families.
624. **THEORIES OF MARRIAGE AND FAMILY THERAPY (4).** Pr., FCD 620 or CED 628 or PG 638 or COI. Overview of the major marriage and family therapy approaches.

625. **HUMAN SEXUAL BEHAVIOR (4).** Pr., FCD 620, 622. Nature of sexual development, normal and abnormal sexual functioning; attitudes toward sex. Treatment of sexual dysfunction.
628. **PARENTAL EDUCATION (4).** Pr., SC 273, FCD 610, 611, and 620 or COI. Parent education, its scope, aims, and effects on parent-child relationships.
629. **READINGS IN FAMILY LIFE AND CHILD DEVELOPMENT (4).** Pr., FCD 267, 270 or COI. Current literature and research concerning the pre-school child; the school-age child; the adolescent; the young adult; problems of later maturity; changing family patterns.
630. **ASSESSMENT IN MARITAL AND FAMILY THERAPY (4).** Pr., or coreq., FCD 623, FED 672 or 673, or COI. An in-depth study of current marital and family assessment techniques with emphasis on administration and interpretation.
637. **PROFESSIONAL ISSUES IN FAMILY AND CHILD DEVELOPMENT (2).** Pr., FCD 620. History of professionalization. Role and function of professional associations and organizations, with professional licensure, ethics, and issues of private practice discussed.
640. **MARRIAGE AND FAMILY THERAPY PREPRACTICUM (4).** Pr., FCD 620, 624, and COI for non-majors. A. Strategic, B. Structural, C. Behavioral, D. Intergenerational, E. Other. Study and clinical practice, under intensive supervision of major approaches to family therapy. Must be taken at least twice, representing two different approaches.
660. **SEMINAR (1-5).** A. Family Relations; B. Child Development; C. Research Techniques; D. Marriage and Family Therapy; E. Parent Education.
662. **PRACTICUM (2-16).** All sections may be repeated for a maximum of 8 hours credit. Pr., Departmental approval. A. Child Development; B. Family Relations; C. Parent Education; D. Day Care and Programs for Young Children.
664. **MARRIAGE AND FAMILY THERAPY PRACTICUM (2-16).** May be repeated for a maximum of 16 hours credit. Pr., departmental approval. A. Group supervision; B. Individual Supervision.
680. **INTERPERSONAL AND FAMILY DYNAMICS (4).** Pr., FCD 610. Theoretical and empirical contributions to the understanding of interpersonal and family relationships, with a focus on processes and dynamics of relationships.
681. **RELATIONSHIP DEVELOPMENT I: CHILDHOOD AND ADOLESCENCE (4).** Pr., FCD 611, 630. Examination of the development of children's relationships with peers and siblings.
682. **RELATIONSHIP DEVELOPMENT II: ADULTHOOD (4).** Pr., FCD 680, 681. Examination of adult interpersonal relationships through the stages of initiation, development, maintenance, and dissolution.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED).** Required of all students under the Thesis Option in any field.
710. **ADVANCED THEORIES OF HUMAN DEVELOPMENT AND FAMILY STUDIES (4).** Pr., FCD 610, 680, 681, 682. Integrative framework of major theoretical approaches for analyzing selected topics in human development and family studies.
723. **ADVANCED RESEARCH METHODS IN FAMILY AND CHILD DEVELOPMENT (4).** Pr., FCD 623, FED 673. In-depth examination of research methods, designs, and data analytic strategies commonly used by family and child development researchers.
799. **RESEARCH AND DISSERTATION. (CREDIT TO BE ARRANGED).**

Finance (FI)

Professors Lloyd, Edmonds, and Hand

Associate Professors Jahera, Head, McCord, Page, and Tole

Assistant Professors Anderson, Brooks, Hudson, Jensen, Pugh, and Sullivan

Effective Fall Quarter 1990, a 2.0 GPA will be required for enrollment in any Business course at the 300-level or above. This rule will apply to both Business and non-Business students.

320. **RISK AND INSURANCE (5).** Pr., FI 361. Essentials of risk management, with the emphasis on the use of insurance in meeting these risks; including the characteristics of property, liability, life and health insurance.
323. **REAL ESTATE (5).** Pr., FI 361. The fundamental principles and practices as applied to the purchase, sale, lease, mortgage, title, and management of real estate.
340. **PERSONAL FINANCE (5).** Pr., non-business student, junior standing. Plans for managing personal financial problems involving insurance, housing, household budgeting, investments, personal and bank loans, credit and time buying, etc.
361. **PRINCIPLES OF BUSINESS FINANCE (5).** Pr., AC 212 or 215, EC 202 or 301 and junior standing. Short-term, intermediate and long-term financing of business firms.
362. **SMALL BUSINESS FINANCE (5).** Pr., FI 361. A continuation of FI 361 with emphasis on financial control, financial forecasting, investment decision-making, identification of sources of financing in a small business environment.
363. **ADVANCED BUSINESS FINANCE (5).** Pr., FI 361. A continuation of FI 361 with emphasis on capital budgeting, cost of capital, growth, promotion, and reorganization.
367. **MONEY MARKETS AND FINANCIAL INSTITUTIONS (5).** Pr., FI 361. Structure and operation of commercial banks and other financial institutions and their role in the financing of business.
400. **STUDENT INTERNSHIP PROGRAM (1-10).** Pr., junior standing and selection by the faculty committee.
421. **PROPERTY INSURANCE (5).** Pr., FI 320. The principles, uses and types of insurance with particular emphasis on fire, marine, automobile, and casualty lines.
422. **LIFE INSURANCE (5).** Pr., FI 320. The organization of the life insurance business and the various types of contracts.

423. **REAL ESTATE FINANCE AND INVESTMENT** (5). Pr., FI 323 or COI. Analysis and evaluation of real estate investments.
451. **MULTINATIONAL FINANCIAL MANAGEMENT** (5). Pr., FI 361. The impact of various tax regulations, currency controls and exchange rates on the multinational firm.
463. **FINANCIAL MANAGEMENT: CASES AND COMPUTER APPLICATIONS** (5). Pr., AC 311 and FI 363. The analysis of complex financial management cases with computers.
464. **INVESTMENTS** (5). Pr., FI 361, junior standing. Individual investment policies, investment institutions, and types of investments available.
466. **SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT** (5). Pr., AC 311, FI 363 and 464. Analysis techniques and selection of securities to meet specific investment objectives.
469. **MANAGEMENT OF FINANCIAL INSTITUTIONS** (5). Pr., AC 311, FI 361 and 367. Concentration on internal operations of financial institutions, especially banks.
470. **HONORS THESIS** (1-6). Pr., open only to persons in the University Honors Program and with consent of the student's Honors Adviser.
471. **UTILITY FINANCE** (5). Pr., AC 311 or COI, and FI 363. An indepth study of financial applications related to public utilities.
490. **SPECIAL PROBLEMS (1-10)**. Pr., FI 363 and senior standing. Advanced individual research and study in finance under guidance of a faculty member.

GRADUATE

650. **SEMINAR (1-10)**. Pr., COI. Intensive study and analysis of finance problems.
651. **ADVANCED MULTINATIONAL FINANCIAL MANAGEMENT** (5). Pr., FI 661 or equivalent and COI. Finance related problems and policies of the multinational firm; emphasizing taxes, accounting, exchange risk, and capital budgeting.
661. **CONCEPTS OF MANAGERIAL FINANCE** (3). Pr., MH 140 and AC 613 or equivalent and for non-business students, consent of the Director of the MBA Program, College of Business. An accelerated course in finance and business applications.
663. **FINANCIAL MANAGEMENT** (5). Pr., FI 661 or equivalent and, for non-business students, consent of Director of the MBA Program, College of Business. Intensive study of theory and problems of business finance from a decision-making, internal, problem-solving point of view.
664. **INVESTMENT ANALYSIS AND MANAGEMENT** (5). Pr., FI 661 or equivalent or COI. Types of investment securities, securities markets and the characteristics and functions of various securities.
665. **CASES IN FINANCIAL MANAGEMENT** (5). Pr., FI 663. The application of formal analytical techniques to practical business situations requiring financial decisions through use of the case approach.
666. **SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT** (5). Pr., FI 661 or equivalent or COI. Principle methods for valuing securities such as stocks and bonds and techniques for managing investment portfolios.
669. **ADVANCED FINANCIAL MARKETS AND INSTITUTIONS** (5). Pr., FI 663. Financial institutions and markets and their impact on business decisions.
690. **SPECIAL PROBLEMS (1-15)**. Pr., COI. Variable content in the finance area.

Fisheries and Allied Aquacultures (FAA)

Professors Shell, Head, Boyd, Davies, Duncan, Grizzle, Grover,
Lovell, Lovshin, Moss, Plumb, Rogers, Schmittou, and Smitherman
Associate Professors Bayne, Dunham, Malvestuto, Phelps, and Popma
Assistant Professors Bain, Brady, and Rouse
Extension Fisheries Specialist Jensen

201. **COMMERCIAL MARINE FISHERIES OF ALABAMA** (3). Exploitation and biology of commercial vertebrates and invertebrates of Alabama and the adjoining Gulf of Mexico, with emphasis on distribution, harvesting technology, processing, and economic values. Laboratory exercises include visits to local processing plants, and a trawling expedition. Taught only at Dauphin Island Sea Lab.
312. **PRACTICAL FISH CULTURE** (5). AS ARRANGED. Credit will be arranged for 3 months in a state or federal hatchery or in an approved commercial hatchery or on other phases of fish culture. All students wishing to take this course must obtain permission to do so from the Head of the Department.
315. **FISHERIES AND ALLIED AQUACULTURES INTERNSHIP (1-5)**. S-U graded. Discipline-related learning while employed with cooperating private industry and state and federal agencies.
393. **UNDERGRADUATE SEMINAR (1)**. Fall. Consideration of various aspects of fisheries work, career options as related to individual interests and curriculum planning.
401. **LIMNOLOGY** (5). LEC. 3, LAB. 6. Pr., CH 104, PS 205, BI 103, or COI. Spring. Biological, chemical and physical factors affecting aquatic life.
402. **FISH HEALTH MANAGEMENT** (5). LEC. 4, LAB. 3. Pr., BI 103 or COI. Spring. Parasitic, bacterial and viral diseases of fish and economically important crustacean and molluscan species. Emphasis on management practices to control diseases.

423. **WATER QUALITY MANAGEMENT IN AQUACULTURE (5). LEC. 5. Pr., CH 203, 208, or COI.** Fall. Chemical and biological aspects of water quality are presented. Lectures stress fundamental concepts applicable to a number of water management fields. Special effort is made to develop relationships between water quality and fish culture, and practical information on water quality management is presented.
425. **MANAGEMENT OF AQUATIC FLORA IN FISHERIES AND AQUACULTURE (5). LEC. 3, LAB. 6. Pr., BI 102 or COI.** Summer, odd years. The role of aquatic vegetation in fish production, its utilization and control.
454. **HATCHERY MANAGEMENT I (5). Pr., FAA 511.** Winter. Warm-water fish seed production systems.
455. **HATCHERY MANAGEMENT II (5). LEC. 2, LAB. 9. Pr., FAA 454.** Spring. Utilization of modern advances in induced and natural warm-water fish spawning.
498. **SPECIAL PROBLEMS IN FISHERIES AND AQUACULTURES (1-5). Pr., senior standing.** A student can register for a total of not more than five hours credit.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **COMMERCIAL AQUACULTURE (3). LEC. 3. Pr., BI 103.** Winter. Status and potential of commercial aquatic farming in Alabama and the Southeastern United States; resources required for diversification of agriculture through aquatic crops, and their integration with traditional land crops.
506. **CATFISH PRODUCTION (5).** Summer, even years. Pr., BI 103 or COI. Principles and practices of farm commercial catfish production. Offered as week-long short course at Auburn with preparatory reading and additional day field trip.
510. **ORGANIZATION, PROGRAMMING AND IMPLEMENTATION OF AQUACULTURAL EXTENSION (3). LEC. 1, LAB. 6. Pr., AEC 202 or equivalent.** Spring. Concepts and practices pertaining to aquacultural extension organization, administration, program development and implementation in the U.S. and developing countries.
511. **PRINCIPLES OF AQUACULTURE (5). LEC. 5. Pr., BI 103 and junior standing.** Winter. Principles underlying aquatic productivity and levels of management as demonstrated by present practices of fish culture around the world.
519. **AQUACULTURE (9). Pr., ZY 401, FAA 538 or ZY 538.** Summer. A review of the technology, principles, and problems relating to the science of aquaculture with emphasis on the culture of marine species. Offered only at the Gulf Coast Research Laboratory, Ocean Springs, Mississippi.
520. **AQUACULTURAL PRODUCTION I (5). LEC. 3, LAB. 8. Pr., BI 103.** Spring. Study of farm organization and operation. Development of skills and attitudes of applied, practical aquaculture emphasizing facility organization and scheduling, equipment use, establishing fish pond populations and crop management in ponds and other culture facilities.
521. **AQUACULTURAL PRODUCTION II (5). LEC. 3, LAB. 8. Pr., BI 103.** Summer. Application and practice of aquacultural technology and management emphasizing fish health, nutrition, hatchery operations, water quality and general environmental management.
522. **AQUACULTURAL PRODUCTION III (5). LEC. 3, LAB. 8. Pr., BI 103.** Fall. Advanced field application of aquacultural practices emphasizing fish inventory, harvesting and transporting, pest management and aquacultural practices assessment.
530. **POND CONSTRUCTION (5). LEC. 2, LAB. 9.** Fall. Principles and practice of site selection, design and construction of aquacultural facilities with emphasis on ponds.
536. **MANAGEMENT OF SMALL IMPOUNDMENTS (5). LEC. 3, LAB. 6. Pr., BI 103.** Summer. Consideration of the species of fish used in management of small impoundments, species balance, population balance analysis, methods of correcting unbalanced conditions, renovation of old impoundments, and related problems of water management.
537. **FISHERIES BIOLOGY (3). Pr., BI 103.** Winter. An introduction to the study of vital statistics of fish populations.
538. **GENERAL ICHTHYOLOGY (5). LEC. 3, LAB. 6. Pr., BI 103.** Fall. Survey of functional morphology, classification and distribution of fishes. Introduction to faunistic literature of North America and the world. Identification of fishes from the Gulf of Mexico and North American fresh waters.
539. **FISHERIES BIOLOGY LABORATORY (2). LAB. 6. Pr., FAA 537 or COI.** Winter. Laboratory exercises in sampling (bias, precision, accuracy), population estimation, age and growth, mortality and population dynamics models.
542. **MARINE FISHERIES MANAGEMENT (6). Pr., COI.** Summer. An overview of practical marine fishery management problems. Offered only at the Gulf Coast Research Laboratory, Ocean Springs, Mississippi.
550. **EARLY LIFE HISTORY OF MARINE FISHES (6). Pr., ZY 306, FAA 538 or ZY 538, and/or COI.** Summer. Reproductive strategies and early developmental processes of marine fishes. Includes discussion of temporal and spatial distribution patterns, population dynamics, and ecological interactions of fish eggs and larvae; role of early stages of fishes in fisheries oceanography, marine ecology, and systematics; methods of sampling and identifying fish eggs and larvae; data quantification and analysis; rearing experiments; techniques for studying larval fish dynamics. Offered only at the Gulf Coast Research Laboratory, Ocean Springs, Mississippi.

GRADUATE

600. **RESEARCH METHODS (3). LEC. 3. Pr., COI.** Fall. Lectures on principles of biological research in fisheries and aquaculture, planning, administration and evaluation of research projects, technical writing and professionalism.
601. **LIMNOLOGY (5). LEC. 3, LAB. 6. Pr., CH 104, PS 205, BI 103.** Spring. Biological, chemical, and physical factors affecting aquatic life.
602. **FISH HEALTH MANAGEMENT (5). LEC. 4, LAB. 3. Pr., BI 103, MB 300, FAA 511, COI.** Spring. Parasitic, bacterial and viral diseases of fish and economically important crustacean and molluscan species. Emphasis on management practices to control diseases. Students will prepare an indepth, fish health management plan.

615. **FISHERY ASSESSMENT/MGT. (3).** LEC. 3. Pr., FAA 539. Summer. Gear selectivity and sampling designs. Interpretation of quantitative data on fish populations. Application of yield models to assessment and management of fish stocks.
617. **QUANTITATIVE TECHNIQUES IN FISHERIES BIOLOGY (3).** LAB. 6. Pr., FAA 539, BST 511 or equivalent or COI. Summer. Analysis of fisheries data using the computer. Application of the Statistical Analysis System (SAS) will be stressed.
619. **CRUSTACEAN AND MOLLUSCAN AQUACULTURE (3).** LEC. 3. Pr., FAA 511 or COI. Fall. General biology and culture techniques of the major shrimp, crawfish and shellfish species cultured throughout the world.
620. **FISH PROCESSING TECHNOLOGY (5).** LEC. 3, LAB. 6. Pr., CH 208, MB 300, or COI. Winter, odd years. Chemical and biological aspects of fishery products as they are related to the use of these products for human foods; principles of preservation; unit operations in processing; packaging, storage, and distribution.
621. **FISH NUTRITION (5).** LEC. 3, LAB. 6. Pr., CH 208 and course in physiology or nutrition or COI. Summer. Fundamental and applied aspects of fish nutrition including the physiology of food assimilation, nutrient requirements, nutrient chemistry of feed sources, ration formulation and practical feeding.
623. **WATER QUALITY MANAGEMENT IN AQUACULTURE (5).** LEC. 5. Pr., CH 208, FAA 511 or COI. Fall. Chemical and biological aspects of water quality are presented. Lectures stress fundamental concepts applicable to a number of water management fields. Special effort is made to develop relationships between water quality and fish culture, and practical information on water quality management is presented. Students will prepare an indepth water management plan for operating aquaculture unit utilizing principles and practices taught in the course.
624. **ADVANCED WATER QUALITY MANAGEMENT IN AQUACULTURE (5).** LEC. 3, LAB. 6. Winter. Pr., FAA 623. Advanced study of water quality as related to fisheries and aquaculture. Laboratory will feature measurements of relevant water quality variables.
625. **MANAGEMENT OF AQUATIC FLORA IN FISHERIES AND AQUACULTURE (5).** LEC. 3, LAB. 6. Pr., or Coreq., BY 506 or equivalent and COI. Summer, odd years. The role of aquatic vegetation in fish production, its utilization and control.
626. **CLIMATOLOGY AND HYDROLOGY IN AQUACULTURE (3).** LEC. 3. Pr., COI. Climatic and hydrologic factors influencing the utilization of water for aquaculture.
637. **STREAM ECOLOGY (3).** LEC. 2, LAB. 3. Pr., FAA 515 or 624 or COI. Fall. Physical, chemical, and biological aspects of river and stream ecosystems emphasizing aquatic resource management and impact assessment.
640. **FISH PARASITOLOGY (3).** LEC. 3. Pr., BI 103. Fall. Basic concepts of fish parasitology and epizootiology, identification and control of fish parasites.
641. **FISH PARASITOLOGY LABORATORY (2).** LAB. 6. Pr., BI 103. Fall. Laboratory and field exercises emphasizing the collection, preparation and identification of fish parasites.
642. **MICROBIAL FISH DISEASES (5).** LEC. 3, LAB. 6. Pr., MB 300. Spring. Bacterial and viral diseases of fishes, their isolation, culture, identification, and control.
644. **MORPHOLOGY & PHYSIOLOGY OF FISH (5).** LEC. 3, LAB. 6. Winter. Pr., FAA 538 or COI. Advanced studies of fish morphology and physiology. Emphasis: on teleosts and topics of importance to students in fishery biology, aquaculture, and fish health.
645. **ADVANCED FISH PARASITOLOGY (3).** LEC. 1, LAB. 6. Pr., FAA 640, 641. Winter, even years. The morphology, taxonomy, life history, ecology and pathological effects of parasites of fish.
646. **ADVANCED MICROBIAL FISH DISEASES (3).** LEC. 1, LAB. 6. Pr., FAA 642 or COI. Fall, odd years. Advanced study of the epizootiology, pathogenesis, isolation, taxonomy and immunology of bacterial and viral diseases of fish.
647. **CLINICAL FISH DISEASE DIAGNOSIS (1-3).** Pr., 640, 641, 642, 644, or COI. Any quarter by arrangement. Clinical diagnosis of fish diseases; necropsy of diseased fish and formulating corrective measures for diseased condition. May be repeated for a maximum of 6 hours credit.
649. **FISH PATHOLOGY (3).** LEC. 2, LAB. 3. Pr., FAA 640, 641, 642, 644, or COI. Summer. Structural and functional changes produced by fish diseases.
653. **FISH GENETICS AND BREEDING (3).** LEC. 3. Pr., ZY 300, FAA 511 or COI. Fall. Philosophy of breeding in fishes and other aquatic animals; methods in fish breeding; traditional animal breeding, genetic engineering and other biotechnologies; inheritance of characters responsible for efficient fish production.
654. **HATCHERY MANAGEMENT I (5).** LEC. 5. Pr., FAA 511. Winter. Advanced study of warm-water fish seed production systems.
655. **HATCHERY MANAGEMENT II (5).** LEC. 2, LAB. 9. Pr., FAA 654. Spring. Utilization of modern advances in induced and natural warm-water fish spawning.
- 693-793. **SEMINAR (1).** LEC. 1. Fall, Winter.
- 698-798. **SPECIAL PROBLEMS IN FISHERIES AND ALLIED AQUACULTURES (2-5).** A. Aquaculture; B. Aquatic Ecology; C. Biology and Management; D. Ichthyology; E. Nutrition; F. Pathology; G. Processing and Technology; H. Water Quality; I. Technology Transfer; J. Computer Applications; K. Aquacultural Facilities; L. Crustacean Aquaculture; M. Hatchery Management; N. Fish Virology; O. Fish Bacteriology.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Food Science (FS)

Professors Davis, Huffman, Lane, Lovell, McCaskey, and Moran
Associate Professors Flood, Jones, and Smith
Assistant Professors Olds, Mikel, and Trout
Instructor Strawn

The Food Science curriculum is administered by the Department of Nutrition and Foods.

201. **INTRODUCTORY FOOD SCIENCE AND TECHNOLOGY (3).** Principles of major food processing methods, concepts of food quality, nutrition, sanitation, safety of food additives and food laws. Overview of careers in food science and food technology. (Same course as NF 201.)
260. **GROWTH AND BODY COMPOSITION (4).** LEC. 2, LAB. 4. Winter, Spring. Prenatal and postnatal growth of muscle, fat, and bone of meat animals; the evaluation of body composition, quality, and yield grading; the pricing of live animals and their carcasses. (Same course as ADS 260.)
331. **MEAT SELECTION AND GRADING (3).** LEC. 1, LAB. 4. Spring. The development of grading standards and application of federal grades to lamb, pork and beef carcasses, comparative evaluation of carcasses and wholesale cuts. Some labs in nearby processing plants. (Same course as ADS 331.)
340. **INDUSTRIAL FOOD PRESERVATION TECHNOLOGY (5).** LEC. 3, LAB. 4. Pr., COI or junior standing. Fall, odd years. Principles of food preservation as applied to industry. Processes considered including refrigeration, pasteurization, canning, freezing, drying, concentration, fermentation, pickling, salting, irradiation, and the use of food additives. (Same course as HF 340.)
355. **FOOD ENGINEERING (5).** Fall. Pr., MH 161, PS 205. Engineering concepts and unit operations used in processing and handling of food products. (Same course as AN 355.)
370. **MEAT SCIENCE (5).** LEC. 4, LAB. 3. Fundamentals of slaughter, processing, storage and merchandising of meat and meat products. Biochemical and physiological implications of nutrition, breeding and antemortem treatment on meat quality, curing and processing. (Same course as ADS 370.)
375. **FUNDAMENTALS OF DAIRY PROCESSING (5).** LEC. 3, LAB. 4. Winter. Physical and chemical characteristics of milk; Milk quality. Basic processing technology.
429. **FOOD SCIENCE SEMINAR (1).** Pr., senior standing. Winter. Lectures, demonstrations and literature reviews by staff, students, and guest lecturers. (Same course as HF 429.)
431. **ADVANCED MEAT JUDGING (3).** Pr., ADS 331. Fall. Practice in evaluation and grading of beef, pork and lamb carcasses and cuts. Development of communication skills for the meat industry and exposure to animal agriculture through training in local meat packing plants and intercollegiate competition. (Same course as ADS 431.)
470. **MEAT PROCESSING (5).** LEC. 3, LAB. 4. Pr., ADS 370. Spring. Principles of meat processing; portion control, restructured meat technology, curing reactions and sausage processing. Physical, sensory, and biochemical properties of processed meats. (Same course as ADS 470.)
543. **FOOD CHEMISTRY (5).** LEC. 3, LAB. 4. Pr., CH 207, NF 318. Winter. The chemistry of the important components of foods and changes occurring during processing, storage and handling. (Same course as HF 543.)
545. **FOOD ANALYSIS AND QUALITY CONTROL (5).** LEC. 3, LAB. 4. Pr., HF 543. Spring. Sensory, chemical and instrumental food analysis and its application to quality control and evaluation of grades and standards.
556. **FOOD MICROBIOLOGY (5).** LEC. 3, LAB. 4. Spring. Relationship of habitat to the occurrence of microorganisms on food; environment affecting the growth of various microorganisms in food; microbiological action in food spoilage and food manufacture; physical, chemical and biological destruction of microorganisms in foods; microbiological examination of foodstuffs; and public health and sanitation microbiology.
570. **ADVANCED MEAT SCIENCE AND MUSCLE BIOLOGY (5).** LEC. 3, LAB. 4. Pr., ADS 370 or equivalent. Spring. Physiology and biochemistry of muscle and its conversion to meat; mechanism of muscle contraction; muscle microanatomy; antemortem and postmortem factors influencing fresh meat composition and quality. (Same course as ADS 670.)
577. **FOOD PLANT SANITATION (4).** LEC. 3, LAB. 2. Pr., MB 201 or 300 or COI. Sanitary regulation of food plants. Hazards in the food system and their elimination. Quality assurance.

Foreign Languages (FL)

Professors DiOrio, Henkels, Madrigal, Perricone, and Spencer
Associate Professors Glaze, Acting Head, Buck, Escarpanter,
Helmke, Latimer, Millman, Morris, and Warbington
Assistant Professors Chaston, Katainen, Lastinger,
Mitrevski, Nadar, Pendergrass, and Wolverton
Instructors Elmore, and Waddell
Language Laboratory Director Cox

It is to the student's advantage to begin foreign language at the highest possible level because by so doing he can gain college credits through advanced placement. On the basis of the Foreign Language Department's evaluation of his previous foreign language training and/or test scores, he may enter the second, third, or fourth quarter course in a language. If he makes a grade of **C** or higher, he will receive 10, 15, or 20 hours, respectively

(5 credit hours for the course and 5, 10, and 15 hours, respectively, for advanced placement). If the student is well enough prepared, he may enter at a level higher than the fourth quarter, but he will not receive more than 15 hours through advanced placement.

If he does not earn at least a C, he will not be granted advanced placement credit. He may then enter the language at a lower level, re-enter at the same level, or attempt another approved language.

Credits earned through advanced placement may be applied toward graduation as well as toward foreign language requirements in various curricula.

While eligible for advanced placement as indicated above, students who are native speakers in a foreign language may begin courses in that language only at the 300-level or higher — excluding conversation courses altogether — if they have received substantial academic preparation in that same language (such as the French *Baccalaureat*, the German *Abitur*, the Spanish *Bachillerato*, or higher).

Students who are either foreign or U.S. ethnic native speakers in a foreign language, but with minimal or limited academic preparation therein, may begin courses in that language only at the 200-level or higher. If special situations arise, such as foreign language learning through extensive residence abroad, the adviser for the specific language involved will make an appropriate entry level determination, within the framework of these guidelines, upon request of the instructor in whose class the student is enrolled.

LANGUAGE PROFICIENCY, INTERNSHIPS, AND HONORS COURSES

- 080. PROFICIENCY IN ENGLISH FOR FOREIGN STUDENTS. (NO CREDIT.)** Individualized and small group instruction primarily for foreign graduate students who need to obtain greater proficiency in comprehension and in spoken and written English, including idiomatic expressions and cultural adaptation. May be repeated.
- 127-128. READING PROFICIENCY IN FRENCH. (3).** Pr., FL 127 for FL 128, or COI. Winter and Spring. Primarily for graduate students, who should consult their advisers for specific departmental language requirements. FL 128 channels students into their field of study, e.g., humanities, social sciences, and sciences. May not be used to satisfy undergraduate language requirements. S-U grade only.
- 137-138. READING PROFICIENCY IN SPANISH. (3).** Pr., FL 137 for FL 138, or COI. Winter and Spring. Primarily for graduate students, who should consult their advisers for specific departmental language requirements. FL 138 channels students into their fields of study, e.g., humanities, social sciences, and sciences. May not be used to satisfy undergraduate language requirements. S-U grade only.
- 157-158. READING PROFICIENCY IN GERMAN. (3).** Pr., FL 157 for FL 158, or COI. Winter and Spring. Primarily for graduate students, who should consult their advisers for specific departmental language requirements. FL 158 channels students into their fields of study, e.g., humanities, social sciences, and sciences. May not be used to satisfy undergraduate language requirements. S-U grade only.
- 177-178. READING PROFICIENCY IN RUSSIAN. (3).** Pr., FL 177 for FL 178, or COI. Winter and Spring. Primarily for graduate students, who should consult their advisers for specific departmental language requirements. FL 178 channels students into their field of study, e.g., humanities, social sciences, and sciences. May not be used to satisfy undergraduate language requirements. S-U grade only.
- 180. PROFICIENCY IN ENGLISH FOR FOREIGN STUDENTS (1).** Individual and small group instruction primarily for foreign graduate students who need to obtain greater proficiency in comprehension and in spoken English, including idiomatic expressions and cultural adaptation. May be repeated for a maximum of 3 credits. Letter grade or S/U option.
- 391. LYRIC DICTION PROFICIENCY IN FRENCH, GERMAN, ITALIAN. (3).** Winter. Stress on phonetics and prosody. Primarily for undergraduate students in music seeking technical control of lyric diction and prosody in French, German, and Italian. May be used for foreign language students for elective credit only. This course does not substitute for the three quarters of foreign language required for the Bachelor of Music degree. May be repeated without credit.
- 471. HONORS THESIS. (3-6).** A requirement for the honors student. Directed readings and research terminating in a thesis. May be repeated once for a maximum of six hours credit.
- 499. FOREIGN LANGUAGE INTERNATIONAL TRADE INTERNSHIP (1-6).** Pr., junior standing and COI. Specific number of hours and applicability toward major to be determined in consultation with the adviser. May be repeated for a maximum of 6 credits.
- 600. FOREIGN LANGUAGE CAREER INTERNSHIP (1-5).** Pr., appropriate training and COI. Students in this course spend a quarter working in an international environment to reinforce the skills they learn in foreign language business courses. The students' performance on the job is evaluated by their immediate supervisor, and their academic performance is evaluated by foreign language instructors, based on reports written in the target language. In Spanish, this course will count for graduate credit toward a 15-hour minor in a related field.

LATIN

- 111-112-113. FIRST YEAR LATIN I-II-III (5-5-5).** FL 111 pr. for 112; FL 112 pr. for FL 113. Fundamentals of Latin; language skills stressed with increasing emphasis on reading, including selections from ancient authors.

- 211-212-213. SECOND YEAR LATIN I-II-III (5-5-5).** Pr., FL 113 or equivalent. FL 211 pr. for 212; FL 212 pr. for 213. Exceptions to this sequence may be granted by departmental consent or when course offerings so require. Review of Latin grammar and syntax and survey of Latin literature through selected readings of authors primarily from the Golden and Silver Ages, 80 B.C. — ca. 140 A.D.

FRENCH

- 121-122-123. FIRST YEAR FRENCH I-II-III (5-5-5).** FL 121 pr. for 122; FL 122 pr. for 123. Fundamentals of French; language skills stressed with progressive emphasis on conversation. Exposure to French civilization.
- 220. FRENCH PHONETICS AND PRONUNCIATION (1)** Pr., FL 122 or equivalent. Introduction to French phonetics and practice in basic French pronunciation patterns.
- 221-222-223. SECOND YEAR FRENCH I-II-III (5-5-5).** Pr., FL 123 or equivalent. FL 221 pr. for 222; FL 222 pr. for 223. Exceptions to this sequence may be granted by departmental consent or when course offerings so require. Language skills stressed; structural review and composition; reading in French literature; exposure to French civilization.
- 228. INTERMEDIATE FRENCH CONVERSATION (5*).** Pr., FL 123 or equivalent, or approval of French Adviser. Summer. Intensive practice in the spoken language with simultaneous review of vocabulary and structure. May be repeated once for credit. When combined with FL 229 can count toward the major or minor in lieu of FL 221.
- 229. INTERMEDIATE FRENCH GRAMMAR AND COMPOSITION (5*).** Pr., FL 123 or equivalent or approval of French Adviser. Summer. Intensive review of French grammar, with emphasis on problem areas and written practice. May be repeated once for credit. When combined with 228 can count toward the major or minor in lieu of FL 221.
- 321. FRENCH CONVERSATION (3 OR 5**).** Pr., FL 223 or equivalent. Fall. Practice in spoken, everyday French, based on texts and situations concerning contemporary life especially in France. May be repeated once for credit but counted only once toward a major.
- 322. FRENCH COMPOSITION (3 OR 5**).** Pr., FL 223 or equivalent. Winter. Practice in writing letters, brief articles, themes and reports, based on original composition and on translation. May be repeated once for credit but counted only once toward a major.
- 323. FRENCH CIVILIZATION (3).** Pr., FL 223 or equivalent. Spring. Consideration of topical aspects of the cultural heritage of France, as reflected in present day life patterns, traditions and institutions.
- 324. FRENCH PHONETICS AND DICTION (3 OR 5**).** Pr., FL 223 or equivalent. Spring. Introduction to the basic principles of French phonetics and diction through sound recognition, discrimination, and intensive practice.
- 325. SURVEY OF FRENCH LITERATURE I (3 OR 5**).** Pr., FL 223 or equivalent. Fall. Readings in French literature from the Middle Ages through the eighteenth century with particular emphasis on the seventeenth and eighteenth centuries.
- 326. SURVEY OF FRENCH LITERATURE II (3 OR 5**).** Pr., FL 223 or equivalent. Winter. Readings in French literature from the nineteenth and twentieth centuries.
- 327. SPECIAL TOPICS IN FRENCH LITERATURE CULTURE OR LANGUAGE (3 OR 5**).** Pr., FL 223 or equivalent. Focus on special aspects of French literature or culture along with social, political, intellectual issues, and cultural reflections, or an in-depth study of French syntax, morphology or phonetics. The specific focus of this course will be announced at least one quarter prior to its being scheduled. May be repeated once for credit.
- 328. FRENCH CIVILIZATION (5*).** Pr., FL 223 or equivalent. Summer. Consideration of selected aspects of French civilization in the light of historical cultural developments. To be offered only in the Auburn Abroad Program. (AA Program in French no longer goes to Canada.)
- 329. BUSINESS FRENCH (3).** Pr., FL 223 or equivalent. Intensive practice in preparing commercial correspondence and reading contracts, agreements, and related documents in French. Emphasis will be placed on the acquisition of a business-oriented vocabulary.
- 420. FRENCH FOR INTERNATIONAL TRADE (4).** Pr., FL 329 or equivalent. Continues topics in FL 329. Practical exercises in preparing and translating trade correspondence and documents in French, as well as assigned group work and case studies under simulated real-life pressures.
- 427. INDEPENDENT WORK IN FRENCH (3 OR 5**).** Pr., four 300-level French courses or equivalent. Directed study in area of special interest, for the superior student in French. May be repeated once for credit.
- 428. FRENCH CONTINUING CONVERSATION (1).** Pr., FL 321 and FL 322, or equivalent. Continuing practice in spoken French to maintain and upgrade proficiency while completing other requirements for graduation. May not be counted toward a major, but may be repeated once for credit.
- 429. FRENCH CONTINUING COMPOSITION (1).** Pr., FL 321 and FL 322, or equivalent. Continuing practice in written French to maintain and upgrade proficiency while completing other requirements for graduation. May not be counted toward a major, but may be repeated once for credit.

GERMAN

- 151-152-153. FIRST YEAR GERMAN I-II-III (5-5-5). LEC. 4, LAB. 2.** FL 151 pr. to 152; 152 pr. to 153. Fundamentals of German. Stress on language skills, with progressive emphasis on conversation. Exposure to Germanic civilization.
- 154. INTENSIVE GERMAN LANGUAGE I (5*).** Summer. Introduction to German. Basic German grammar and conversation. This course may be substituted for FL 153.

*This course is offered only in the Auburn Abroad Program.

**300; 500; and 600-level French and Spanish courses will carry five quarter hours of credit only when taken in the Auburn Abroad Program.

- 251-252-253. **SECOND YEAR GERMAN I-II-III (5-5-5).** Pr., FL 153 or equivalent, FL 251 pr. to 252; 252 pr. to 253. Exceptions to the sequence may be granted by departmental consent or when course offerings so require. Stress on language skills; structural review and composition; readings in German literature and exposure to German civilization.
254. **INTERMEDIATE GERMAN (5*).** Pr., FL 153 or equivalent, or approval of German Adviser. Summer. Grammar, conversation, and reading. Intensive practice in German with simultaneous review of vocabulary and structure. This course does not substitute for FL 251, 252, or 253, but may count toward the major or minor in German.
256. **VIENNA: GROWTH OF AN URBAN CIVILIZATION (3*).** Pr., FL 252 and 253 or equivalent. Summer. An introduction to Viennese history and culture.
257. **AUSTRIAN CULTURE AND CIVILIZATION. (3*).** Pr., FL 252 and FL 253. Summer. Through discussion of slides and visits to historical and modern sites and Vienna, this course analyzes Austrian civilization and culture.
351. **GERMAN CONVERSATION (3 or 5**).** Pr., FL 253 or COI. Fall. Practice in spoken, everyday German, based on texts and situations concerning contemporary life in Germany or other German-speaking countries. May be repeated once for credit but counted only once toward a major.
352. **GERMAN COMPOSITION (3 or 5**).** Pr., FL 351 or COI. Winter. Practice in writing letters, brief articles, themes and reports based on original composition and translation. May be repeated once for credit but counted only once toward a major.
353. **GERMAN CIVILIZATION (3).** Pr., FL 352 or COI. Spring. Review of the cultural heritage of the German language, with emphasis on its present-day status, influence and civilization in Germany and abroad.
354. **SURVEY OF GERMAN LITERATURE I (3).** Pr., FL 353 or COI. Fall. Readings in German literature of the earliest periods to the eighteenth century.
355. **SURVEY OF GERMAN LITERATURE II (3).** Pr. FL 353 or COI. Winter. Readings in German literature of the nineteenth century.
356. **SURVEY OF GERMAN LITERATURE III (3).** Pr., FL 353 or COI. Spring. Readings in German literature of the twentieth century.
357. **SEMINAR IN GERMAN LITERATURE (3).** Pr., FL 251 or equivalent. Summer. Readings in German literature from selected periods. Normally offered in Summer Quarter only.
359. **BUSINESS GERMAN (3).** Pr., FL 353 or COI. Intensive practice in preparing commercial correspondence and reading contracts, agreements, and related documents in German. Emphasis will be placed on the acquisition of a business-oriented vocabulary.
399. **EXPERIENTIAL LEARNING — GERMAN (3-6*).** Internship in Vienna.
450. **GERMAN FOR INTERNATIONAL TRADE (3).** Pr., FL 359 or equivalent. Practice in handling, preparing and translating international trade correspondence and documents in German. Development of case studies and other realistic international trade group work in German and English, under simulated real-life pressures.
451. **GERMAN CLASSICISM (3).** Pr., four 300-level German courses or equivalent. Alternate Fall. Consideration, analysis, and criticism of German writing of the classical period.
452. **GERMAN ROMANTICISM (3).** Pr., four 300-level German courses or equivalent. Alternate Winter. Consideration, analysis, and criticism of German Romantic writing.
453. **GERMAN REALISM AND NATURALISM (3).** Pr., four 300-level German courses or equivalent. Alternate Spring. Consideration, analysis, and criticism of German writing of Realism and Naturalism.
454. **GERMAN DRAMA (3).** Pr., four 300-level German courses or equivalent. Alternate Fall. Consideration, analysis, and criticism of selected German theater.
455. **TWENTIETH-CENTURY GERMAN LITERATURE (3).** Pr., four 300-level German courses or equivalent. Consideration, analysis, and criticism of selected German prose prior to World War II.
456. **CONTEMPORARY GERMAN LITERATURE (3).** Pr., four 300-level German courses or equivalent. Consideration, analysis, and criticism of selected German writing since World War II.
457. **INDEPENDENT WORK IN GERMAN (3).** Pr., at least one 400-level German course and COI. Directed study in area of special interest for the superior student in German. May be repeated once for credit.
458. **GERMAN CONTINUING CONVERSATION (1).** Pr., four 300-level German courses, including FL 351 and FL 352, or equivalent. Continuing practice in spoken German to maintain and upgrade proficiency while completing other requirements for graduation. May be repeated once for credit, but counted only once toward a major.
459. **GERMAN CONTINUING COMPOSITION (1).** Pr., four 300-level German courses, including FL 351 and FL 352, or equivalent. Continuing practice in written German to maintain and upgrade proficiency while completing other requirements for graduation. May be repeated once for credit, but counted only once toward a major.

ITALIAN

- 141-142-143. **FIRST YEAR ITALIAN I-II-III (5-5-5);** FL 141 pr. to 142; 142 pr. to 143. Fundamentals of Italian. Language skills stressed, with progressive emphasis on conversation. Exposure to Italian civilization.

*This course is taught only in the Auburn Abroad Program.

**300-level German courses will carry five quarter hours of credit only when taken in the Auburn Abroad Program.

- 241-242-243. **SECOND YEAR ITALIAN I-II-III (5-5-5).** Pr., FL 143 or equivalent. FL 241 pr. to FL 242; FL 242 pr. to FL 243. (Exceptions to this sequence may be granted by departmental consent or when course offerings so require.) Stress on language skills; structural review and composition; readings in Italian literature and exposure to Italian civilization.

PORTUGUESE

- 161-162-163. **FIRST YEAR PORTUGUESE I-II-III (5-5-5).** FL 161 pr. to 162; 162 pr. to 163. Fundamentals of Portuguese. Stress on language skills; progressive emphasis on conversation. Exposure to Luso-Brazilian civilization.
- 261-262-263. **SECOND YEAR PORTUGUESE I-II-III (5-5-5).** Pr., FL 163 or equivalent. FL 261 pr. to 262; 262 pr. to 263. Exceptions to this sequence may be granted by departmental consent or when course offerings so require. Stress on language skills; structural review and composition; readings in Luso-Brazilian literature. Exposure to Luso-Brazilian civilization.

RUSSIAN

- 171-172-173. **FIRST YEAR RUSSIAN I-II-III (5-5-5).** FL 171 pr. to 172; FL 172 pr. to 173. Fundamentals of Russian. Stress on language skills; progressive emphasis on conversation. Exposure to Russian civilization.
- 174-175. **BEGINNING RUSSIAN FOR READING COMPREHENSION I-II (3-3).** FL 174 or equivalent, pr. to 175. Not open to students who have completed FL 171-173, or above. Exceptions may be granted by departmental consent. Emphasis on acquiring reading skills in Russian. Reading from contemporary Soviet print media.
- 271-272-273. **SECOND YEAR RUSSIAN I-II-III (5-5-5).** Pr., FL 173 or equivalent. FL 271 pr. to 272; FL 272 pr. to 273. Exceptions to this sequence may be granted by departmental consent or when course offerings so require. Stress on language skills; structural review and composition. Readings in Russian literature; continued exposure to Russian civilization.
274. **INTRODUCTION TO RUSSIAN CULTURE (in English) (5).** Intensive exposure to Russian culture from the tenth century to the present, as reflected in the fine arts and literature. Emphasis on geographic, social, artistic, spiritual and political forces in Russian culture, and its contribution to world cultures. Frequent guest lecturing by faculty from other departments.
371. **RUSSIAN CONVERSATION (3).** Pr., FL 273 or equivalent. Practice in spoken Russian, based on reading of literary texts, and on situations concerning contemporary life in the Soviet Union.
372. **RUSSIAN COMPOSITION (3).** Pr., FL 273 or equivalent. Practice in writing letters, brief articles, themes and reports, based on original compositions, literary texts and other topics.
373. **RUSSIAN CIVILIZATION (3).** Pr., FL 273 or equivalent. Review of the cultural heritage of the Russian language as reflected in literature and folklore.
374. **RUSSIAN LITERATURE FROM 1820-1860 IN TRANSLATION (3).** Literary history of the period: selected works by Pushkin, Lermontov, Gogol, Goncharov, Turgenev.
375. **RUSSIAN LITERATURE FROM 1860-1917 IN TRANSLATION (3).** Dostoevsky, Tolstoy, Chekhov.
376. **SOVIET RUSSIAN LITERATURE FROM 1917 TO THE PRESENT IN TRANSLATION (3).** Analysis and criticism of literary movements and selected writers.

SPANISH

- 131-132-133. **FIRST YEAR SPANISH I-II-III (5-5-5).** FL 131 pr. to 132; FL 132 pr. to 133. Fundamentals of Spanish. Language skills stressed with progressive emphasis on conversation. Exposure to Hispanic civilization.
- 231-232-233. **SECOND YEAR SPANISH I-II-III (5-5-5).** Pr., FL 133 or equivalent. FL 231 pr. to 232; FL 232 pr. to 233. Exceptions to this sequence may be granted by departmental consent or when course offerings so require. Language skills stressed; structural review and composition; reading in Spanish literature; exposure to Hispanic civilization.
238. **INTERMEDIATE SPANISH CONVERSATION (5*).** Pr., FL 133 or equivalent, or approval of Spanish Adviser. Summer. Intensive practice in the spoken language with simultaneous review of vocabulary and structure. May be repeated once for credit but counted only once toward the major.
239. **INTERMEDIATE SPANISH GRAMMAR AND COMPOSITION (5*).** Pr., FL 133 or equivalent or approval of Spanish Adviser. Summer. Intensive review of Spanish grammar, with emphasis on problem areas and written practice. May be repeated once for credit but counted only once toward the major.
330. **COMMERCIAL SPANISH TRANSLATION (3).** Pr., FL 233 or equivalent. Spring. The problems and approaches to commercial translation emphasizing the primary areas in which translations are most used: business letter, export-import documentation and conversation.
331. **SPANISH CONVERSATION (3 OR 5**).** Pr., FL 233 or equivalent. Intensive practice in the spoken language, with simultaneous review of vocabulary and structure. May be repeated once for credit but counted only once toward a major.
332. **SPANISH COMPOSITION (3 OR 5**).** Pr., FL 233 or equivalent. Practice in writing letters, brief articles, themes and reports, based on original composition and translation. May be repeated once for credit but counted only once toward a major.
333. **SPANISH AMERICAN CIVILIZATION I (3).** Pr., FL 233 or equivalent. Alternate Fall. Intensive exposure to the culture of pre-Colombian Spanish America to Independence as reflected in the fine arts and literature. Emphasis on geographic, historical, social, artistic, spiritual, and political forces in Spanish American civilization and its contribution to world cultures.

334. **SPANISH AMERICAN CIVILIZATION II (3)**. Pr., FL 233 or equivalent. Alternate Winter. Intensive exposure to the culture of Spanish America from Independence to the twentieth century as reflected in the fine arts and literature. Emphasis on geographic, historical, social, artistic, spiritual, and political forces in Spanish American civilization and its contribution to world cultures.
335. **SPANISH AMERICAN CIVILIZATION III (3)**. Pr., FL 233 or equivalent. Alternate Spring. Intensive exposure to the culture of contemporary Spanish America as reflected in the fine arts and literature. Emphasis on geographic, historical, social, artistic, spiritual, and political forces in Spanish American civilization and its contribution to world cultures.
336. **SPANISH CIVILIZATION I (3)**. Pr., FL 233 or equivalent. Alternate Fall. Intensive exposure to the culture of Spain up to 1700 as reflected in the fine arts and literature. Emphasis on geographic, historical, social, artistic, spiritual, and political forces in Spanish civilization and its contribution to world cultures.
337. **SPANISH CIVILIZATION II (3)**. Pr., FL 233 or equivalent. Alternate Winter. Intensive exposure to the culture of Spain from 1700 to the present, as reflected in the fine arts and literature. Emphasis on geographic, historical, social, artistic, spiritual, and political forces in Spanish civilization and its contribution to world cultures.
338. **SEMINAR IN ADVANCED COMPOSITION AND CONVERSATION (3 or 5**)**. Pr., FL 233 or equivalent. Summer. Intensive practice in composition and conversation through original and directed themes as well as through oral presentations. May be repeated once for credit.
339. **BUSINESS SPANISH (3)**. Pr., FL 233 or equivalent. Fall. Intensive practice in preparing commercial correspondence and reading contracts, agreements, and related documents in Spanish. Emphasis will be placed on the acquisition of a business-oriented vocabulary.
340. **SPANISH-AMERICAN COMMUNITY DIALOGUE (3)**. Pr., FL 331 or FL 332. Practical Spanish for American public safety personnel with emphasis on learning key phrases useful when handling situations involving authoritative intent, cooperation, or offering of assistance. Medical and legal terminology including specific vernacular and idiom variations. Offering Spring, odd years.
341. **SEMINAR IN SPANISH CIVILIZATION (5**)**. Pr., FL 233 or equivalent. An intensive study of Spanish Civilization through Spanish Art. Students will visit various art museums in Spain. May be repeated for credit.
342. **SEMINAR IN BUSINESS SPANISH (5**)**. Pr., FL 331 or 332 or equivalent. Intensive study of the specialized spoken and written business terminology of Spanish. Special emphasis on practical usage through direct contact with the business environment of Spain during residence in Madrid. May be taken as substitution for FL 339, with consent of adviser.
430. **SPANISH FOR INTERNATIONAL TRADE (3)**. Pr., FL 339 or equivalent. Winter. Practice in handling, preparing and translating international trade correspondence and documents in Spanish. Development of case studies and other realistic international trade group work in Spanish and English, under simulated real-life pressures.
431. **SURVEY OF SPANISH LITERATURE TO 1700 (3)**. Pr., FL 233 or equivalent. Alternate Fall. Development of Spanish literature from its beginnings through the Golden Age (1700).
432. **SURVEY OF MODERN SPANISH LITERATURE (3)**. Pr., FL 233 or equivalent. Alternate Winter. Panorama of Spanish literature between 1700 and 1900.
433. **SURVEY OF CONTEMPORARY SPANISH LITERATURE (3)**. Pr., FL 233 or equivalent. Alternate Spring. Panorama of the development of contemporary Spanish literature from the Generation of '98 to the present.
434. **SURVEY OF SPANISH AMERICAN LITERATURE I (3)**. Pr., FL 233 or equivalent. Alternate Fall. Panorama of Spanish American literature from the discovery of America to Modernism.
435. **SURVEY OF SPANISH AMERICAN LITERATURE II (3)**. Pr., FL 233 or equivalent. Alternate Winter. Panorama of Spanish American literature from Modernism to the present.
437. **SEMINAR IN HISPANIC LITERATURE (3 or 5**)**. Pr., four 300-level Spanish courses or equivalent. Readings in Hispanic literature from selected genres, authors, periods, or movements. May be repeated once for credit.
438. **SPANISH CONTINUING CONVERSATION (1)**. Pr., FL 331 and FL 332, or equivalent. Continuing practice in spoken Spanish to maintain and upgrade proficiency while completing other requirements for graduation. May be repeated once for credit.
439. **SPANISH CONTINUING COMPOSITION (1)**. Pr., FL 331 and FL 332, or equivalent. Continuing practice in written Spanish to maintain and upgrade proficiency while completing other requirements for graduation. May be repeated once for credit, but counted only once toward a major.
440. **SEMINAR IN PRACTICAL PHONETICS (3 or 5**)**. Pr., FL 331 or 332 or equivalent. Advanced training in practical phonetics with specific course assignments determined by needs of students. May be repeated once for credit.
441. **SEMINAR IN SPANISH FOR INTERNATIONAL TRADE (5**)**. Pr., FL 339 or 342 or equivalent. Intensive study in handling, preparing and translating international trade correspondence and documents in Spanish. Special emphasis on practical applications through direct contact with the business environment of Spain during residence in Madrid. May be taken as substitution for FL 430, with consent of adviser.

CHINESE

- 181-182-183. **FIRST YEAR CHINESE I-II-III (5-5-5)**. FL 181 pr. for 182; FL 182 for 183. Fundamentals of Chinese. Stress on language skills, with progressive emphasis on conversation. Exposure to Chinese civilization.

*This course is offered only in the Auburn Abroad Program.

**300, 500 and 600-level French and Spanish courses will carry five quarter hours of credit only when taken in the Auburn Abroad Program.

- 281-282-283. SECOND YEAR CHINESE I-II-III (5-5-5).** Pr., FL 183 or equivalent. FL 281 pr. for 282; 282 pr. for 283. Stress on language skills; structural review and composition; readings in Chinese literature and exposure to Chinese civilization.

JAPANESE

- 191-192-193. FIRST YEAR JAPANESE I-II-III (5-5-5).** FL 191 pr. for 192; FL 192 pr. for 193. Fundamentals of Japanese. Stress on language skills, with progressive emphasis on conversation. Exposure to Japanese civilization.
- 291-292-293. SECOND YEAR JAPANESE I-II-III (5-5-5).** Pr., FL 193 or equivalent. FL 291 pr. to 292; FL 292 pr. to 293.

FRENCH ADVANCED UNDERGRADUATE AND GRADUATE COURSES

- 520. FRENCH FOR INTERNATIONAL TRADE (4).** Pr., FL 329 or equivalent. Practice in handling, preparing and translating international trade correspondence, documents and related legal procedures in French. Development of case studies and other international trade group work in French and in English, under simulated real-life pressures.
- 526. SEMINAR IN ADVANCED LANGUAGE SKILLS (4 or 5**).** Pr., four 300-level French courses or equivalent. Practice in writing and speaking French. Exercises include compositions and expositions. May be repeated for credit.
- 527. SEMINAR IN FRENCH LITERARY GENRES AND MOVEMENTS (4 or 5**).** Pr., four 300-level French courses or equivalent. Selected readings in French literary genres or movements.
- 529. ADVANCED FRENCH CIVILIZATION (5).** Pr., four 300-level French courses or equivalent. Summer. An indepth study of French civilization, with emphasis on historical, political, and cultural influences. To be offered only in Auburn Abroad Program. May be repeated for credit.

SPANISH ADVANCED UNDERGRADUATE AND GRADUATE COURSES

- 539. SEMINAR IN COMPOSITION AND STYLISTICS (3 OR 5**).** Pr., four 300-level Spanish courses or equivalent. Advanced training in composition and stylistics with specific course materials determined by needs of students. May be repeated once for credit.
- 540. SEMINAR IN CONVERSATION AND PHONETICS (3 OR 5**).** Pr., four 300-level Spanish courses or equivalent. Advanced training in conversation and phonetics with specific course materials determined by needs of students. May be repeated once for credit.

GRADUATE COURSES IN FRENCH AND SPANISH

A non-sequential offering of courses required of students pursuing the degrees of Master of Arts in French, Master of Arts in Spanish, Master of French Studies, Master of Hispanic Studies, and Master of Arts in College Teaching. Representative works, literary movements, and techniques of literary criticism within respective genres of French, Spanish American, and Spanish literature are emphasized and analyzed in depth. A background in the history of the French language and of the Spanish language is presented and required of all Master's candidates. Courses may be taken concurrently.

FRENCH GRADUATE COURSES

- 611. ADVANCED FRENCH CONVERSATION AND PHONETICS (4 or 5**).** Pr., four 300-level French courses or equivalent. Training in oral French to increase vocabulary, improve fluency and pronunciation. May be repeated once for credit.
- 612. ADVANCED FRENCH COMPOSITION AND STYLISTICS (4 or 5**).** Pr., four 300-level courses or equivalent. Exercise in advanced grammar and syntax designed to enhance the student's linguistic ability. Practice in composition, *explication de texte*, and in the use of stylistic devices derived from significant literary sources. May be repeated once for credit.
- 613. ADVANCED FRENCH CIVILIZATION (4 or 5**).** Pr., four 300-level French courses or equivalent. An indepth study of French civilization, with emphasis on the relationship of history, arts, and literature from the Middle Ages to the present.
- 614. FRENCH TRANSLATION SKILLS (4).** Pr., four 300-level French courses. Exercises and training in techniques of French-English/English-French translation.
- 615. FRENCH LITERATURE AND CIVILIZATION OUTSIDE CONTINENTAL FRANCE (4).** Pr., four 300-level French courses or equivalent. Consideration of civilization and analysis and criticism of selected French literature from Africa, the Antilles, Canada, and other French-speaking areas.
- 620. SPECIAL TOPICS IN FRENCH LITERATURE, CULTURE OR LANGUAGE (4).** Focus on special aspects of French literature or culture along with social, political, intellectual issues, and cultural reflections, or an indepth study of French syntax, morphology or phonetics. The specific focus of this course will be announced at least one quarter prior to its being scheduled. May be repeated for credit.
- 621. MEDIEVAL FRENCH LANGUAGE, LITERATURE, AND CIVILIZATION (4).** A brief introduction to the history of the French language and the development of Medieval French literature in the light of the history, thought, and art of that period.
- 622. SIXTEENTH-CENTURY FRENCH LITERATURE AND CIVILIZATION (4).** The development of French literature during the sixteenth-century in the light of French history, thought, and art of that period.

**500 and 600-level French and Spanish courses will carry five quarter hours of credit only when taken in the Auburn Abroad Program.

623. **SEVENTEENTH-CENTURY FRENCH LITERATURE AND CIVILIZATION (4).** The development of French literature during the seventeenth century in the light of French history, thought, and art of that period.
624. **EIGHTEENTH-CENTURY FRENCH LITERATURE AND CIVILIZATION (4).** The development of French literature during the eighteenth-century in the light of French history, thought, and art of that period.
625. **NINETEENTH-CENTURY FRENCH LITERATURE AND CIVILIZATION (4).** The development of nineteenth-century French literature in the light of French history, thought, and art from 1801 to 1870.
626. **NINETEENTH AND TWENTIETH-CENTURY FRENCH LITERATURE AND CIVILIZATION (4).** The development of French literature in the light of French history, thought, and art from 1871 to 1914.
627. **TWENTIETH-CENTURY FRENCH LITERATURE AND CIVILIZATION (4).** The development of twentieth-century literature in the light of French history, thought and art from 1915 to the present.
628. **FRENCH LITERARY GENRES OR THEMES (4).** A particular genre or theme throughout French literature. The specific subject of the course will be announced one quarter prior to its being scheduled.
629. **THE FRENCH PRESS (4).** The political, cultural, and intellectual events in France and the world as reflected in major French newspapers and magazines. May be repeated for credit.
660. **RESEARCH METHODS (1).** An introduction to the methods of scholarly investigation in literary history and criticism. Special emphasis is given to practical training in the use of bibliographical resources and in the preparation of formal written presentation of research results.
661. **FRENCH PHONETICS, PRONUNCIATION AND DICTION (4).** Exercises and training in advanced techniques of French phonetics, pronunciation, and diction.
662. **FRENCH STYLISTICS AND EXPLICATION DE TEXTE (4).** Exercises and training in advanced techniques of French *explication de texte*, stylistics and writing skills.
663. **INTRODUCTION TO FRENCH GRADUATE STUDIES AND/OR COLLEGE LEVEL FRENCH INSTRUCTION (1-4).** Orientation to French graduate studies, including selection of appropriate field of specialization and type of degree, and/or introduction to college-level French instruction including, critical observation of performance and guidance by designated instructors. This course must be taken every quarter while student is holding teaching assistantship, but credit may not count toward degree.
664. **DIRECTED READINGS IN FRENCH LITERATURE (1-4).** Supervised study in specialized areas. Registration is by permission of the adviser and the instructor. May be repeated for credit.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**

SPANISH GRADUATE COURSES

601. **HISTORY OF THE SPANISH LANGUAGE (3).** A diachronic study of the development of the Spanish language from its Latin origins to the present.
602. **MEDIEVAL SPANISH LITERATURE (3).** An introduction to medieval Spanish literature through a study of representative texts from the various genre of the period.
603. **SIXTEENTH CENTURY SPANISH LITERATURE (3).** A critical and historical study of representative literary works in all genres from around 1492 to the end of the sixteenth century.
604. **SEVENTEENTH CENTURY SPANISH LITERATURE (3).** A critical and historical study of representative works in all genres in the seventeenth century with emphasis on Baroque literature.
605. **EIGHTEENTH/NINETEENTH CENTURY SPANISH LITERATURE (3).** A critical and historical study of representative works in all genres in the eighteenth and nineteenth centuries.
606. **TWENTIETH CENTURY SPANISH LITERATURE (3).** A critical and historical study of twentieth century peninsula literature through representative works in all genres.
607. **COLONIAL SPANISH AMERICAN LITERATURE (3).** Representative literary genres and authors of Vice Regal America from Spanish transcriptions of pre-Columbian works to those just prior to the Wars of Independence.
608. **NINETEENTH CENTURY SPANISH AMERICAN LITERATURE (3).** Representative authors in major genres from the period of Independence through *modernismo*.
609. **TWENTIETH CENTURY MIDDLE AMERICAN LITERATURE (3).** Representative authors in all genres from the Hispano-Caribbean area, Mexico, and the countries of Central America.
610. **TWENTIETH CENTURY SOUTH AMERICAN LITERATURE (3).** Representative authors in all genres from the countries of South America.
643. **DIRECTED RESEARCH (1).** Study and research in specialized areas under the direct supervision of one faculty member. Registration by permission only. May be repeated twice for credit.
644. **INTRODUCTION TO COLLEGE-LEVEL SPANISH INSTRUCTION (1).** Instruction for graduate teaching assistants including critical observation in performance and guidance by a designated supervisory professor. This course is required of all graduate students each quarter in which they hold a graduate teaching assistantship. This course does not count toward a graduate degree.
645. **RESEARCH METHODS (1).** An introduction to the methods of scholarly investigation in literary history and criticism. Special emphasis is given to practical training in the use of bibliographical sources and in the preparation of research papers. This course may not be counted toward a graduate degree.
670. **SEMINAR IN SPANISH PROSE (3).** In depth study of a selected genre, literary, movement or author(s) in Spanish prose. This course may be repeated for credit and counted towards the degree.

671. **SEMINAR IN SPANISH THEATER (3).** In depth study of a selected period, movement, or dramatist(s). This course may be repeated for credit and counted towards the degree.
672. **SEMINAR IN SPANISH POETRY (3).** In depth study of a selected period, movement, or poet(s). This course may be repeated for credit and counted towards the degree.
673. **LITERARY CRITICISM (3).** Contemporary literary criticism as it relates to Spanish and Spanish American literature. This course may be repeated for credit and counted towards the degree.
674. **SPANISH LINGUISTICS (3).** Synchronic study of the Spanish language, focusing on phonology, morphology, syntax and lexicon, taking into consideration dialectal differences.
675. **SEMINAR IN SPANISH AMERICAN PROSE (3).** In depth study of a selected genre, literary movement, or author(s) in Spanish American prose. This course may be repeated for credit and counted towards the degree.
676. **SEMINAR IN SPANISH AMERICAN THEATER (3).** In depth study of one or more playwrights or tendencies of the Spanish American Theater. This course may be repeated for credit and counted towards the degree.
677. **SEMINAR IN SPANISH AMERICAN POETRY (3).** In depth study of a selected period, movement, or poet(s). This course may be repeated for credit and counted towards the degree.
678. **SEMINAR IN HISPANIC LITERATURE AND/OR CULTURE (3 or 5**).** An analysis of the cultural milieu which influences literary creativity within a given geographical area or historical period. This course may be repeated for credit and counted towards the degree.
679. **SEMINAR IN LINGUISTICS (3 or 5**).** In depth analysis of linguistics problems or peculiarities in a certain geographical area or historical period. This course may be repeated for credit and counted towards the degree.
683. **SEMINAR IN SPANISH LITERATURE (3 or 5**).** In depth study of a selected period, movement, or author(s) from the various genres of Spanish literature.
687. **SEMINAR IN LATIN AMERICAN LITERATURE (3).** In depth study of a selected period, movement, or author(s) from the various genres of Latin American literature.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**

**500 and 600-level French and Spanish courses will carry five quarter hours of credit only when taken in the Auburn Abroad Program.

Forest Engineering (FYE)

Professors Thompson and Turnquist

Associate Professor Lanford

Assistant Professors Brinker, Taylor, and Tufts

Adjunct Associate Professor Sirois

Adjunct Assistant Professor Stokes

101. **INTRODUCTION TO AGRICULTURAL AND FOREST ENGINEERING (1).** LEC. 1, LAB. 2. S-U graded. Perspectives on the agricultural and forest engineering profession. Creative design and the engineer's approach to problem solving. Introduction to the technical specialties of engineering for agriculture and forestry and career opportunities. (Same as AN 101).
130. **INTRODUCTION TO ENGINEERING DESIGN FOR BIOLOGICAL SYSTEMS. (1).** LAB. 3. A supervised engineering design project to design components and/or systems to solve a real problem in an agricultural or forestry related industry. Open only to students classified 01 or 02. (Same as AN 130).
201. **ENGINEERING PRINCIPLES IN AGRICULTURE AND FORESTRY (5).** LEC. 4, LAB. 3, Pr., MH 161, Coreq., FORTRAN Programming. Engineering concepts and principles applied to agricultural and forest problems. Creativity and design. Unit operations of agricultural and forest engineering. (Same as AN 201).
304. **FOREST SURVEYING (5).** LAB. 15. Pr., MH 162 or 169. Summer. Basic concepts and procedures of surveying as applied to forestry.
311. **FUNDAMENTALS OF MOBILE EQUIPMENT DESIGN (5).** LEC. 4, LAB. 3. Pr., ME 301, 321, MH 265, and AN 201 or COI. Basic engineering analysis, synthesis, and design concepts applied to mobile field equipment and prime movers for agricultural, forestry, and industrial use. Includes mechanics of machines, traction mechanics, engine performance, safety and functional performance measurement. (Same as AN 311).
401. **DESIGNING AND SELECTING FOREST EQUIPMENT (3).** LEC. 3. Pr., AN 311, ME 316. Spring. Power requirements, design aspects, hydraulic systems, testing, rating and use of forest machinery. Vehicle-Terrain relationships. (Same as AN 401).
402. **FOREST ROADS DESIGN (3).** LEC. 2, LAB. 3. Pr., FYE 304. Fall. Design, construction and maintenance of secondary and temporary road systems with an emphasis on preconstruction planning and design. Includes earth work calculations, drainage structures and erosion control. (Same as AN 402).
403. **APPLIED STRUCTURAL ANALYSIS AND DESIGN (3).** LEC. 2, LAB 3. Pr., CE 207. Fall. Analysis and design of structural systems of agriculture and forestry. (Same as AN 403).
430. **ENGINEERING DESIGN FOR BIOLOGICAL SYSTEMS I (4).** LEC. 3, LAB. 3. Pr., AN 403, senior standing, COI. Design of equipment, structures, and systems for food, feed, fiber, forest products, and animal production and processing utilizing engineering principles. (Same as AN 430).
490. **SPECIAL TOPICS (2-5).** (CREDIT TO BE ARRANGED.) Pr., COI. May be taken more than one quarter for a maximum of 10 quarter hours. (Same as AN 490).

ADVANCED UNDERGRADUATE AND GRADUATE

509. **HYDRAULIC CONTROL SYSTEMS (5). LEC. 4, LAB. 3.** Pr., CE 310 or ME 340. Design and analysis of hydraulic systems, with an introduction to control system theory and design. Construction and operation of hydraulic components, includes component disassembly and system design, modeling and testing. (Same as AN 509).
530. **ENGINEERING DESIGN FOR BIOLOGICAL SYSTEMS II (4). LEC. 2, LAB. 6.** Pr., AN/FYE 430 and COI. A supervised engineering design project to design components and/or systems to solve a real problem in an appropriate industry. Utilization of many engineering principles is required. (Same as AN 530).
570. **HARVESTING (3). LEC. 2, LAB. 3.** Pr., FY 317, 523, 540. Winter. Harvesting systems, cost analysis, and environmental impacts.
571. **ADVANCED HARVESTING (3). LEC. 3.** Pr., FYE 570 or COI. Spring. Combines basic fundamentals of harvesting into analysis of systems. Looks at specific harvesting problems and their solutions. Gives additional attention to topics introduced in FYE 570.
572. **ENGINEERING DESIGN OF FOREST HARVEST SYSTEMS (5). LEC. 4, LAB. 3.** Pr., FY 523, 540, FYE 401, CE 310. Synthesizing harvest systems from component machines; harvesting functions; system balance, component and system productivity; component and system cost; development of a harvest plan.
590. **SPECIAL TOPICS. (CREDIT TO BE ARRANGED.) (2-5).** Pr., COI. May be taken more than one quarter for a maximum of 10 quarter hours. (Same as AN 590).

GRADUATE

617. **REMOTE SENSING (3). LEC. 2, LAB. 3.** Pr., PS 206 or PS 221, BY 513 or FY 423, and COI. Spectral regions. Reflectance and emission of electro-magnetic energy. Types of remote sensing systems, including: photographic, in the visible and infrared spectral regions; line-scanning in the visible, infrared, and microwave spectral regions; and radar. The applications of remote sensing imagery to non-urban management.
690. **SPECIAL TOPICS (CREDIT TO BE ARRANGED.) (2-5)** Pr., COI. May be taken more than one quarter for a maximum of 10 quarter hours. (Same as AN 690).

Forest Management (FY)**

Professors Thompson, Gjerstad, Raper, and Wade
Associate Professors Dixon, Flick, Golden, Kelley, Larsen, Lockaby, and South
Assistant Professors Caulfield, Chappelka, Davis, DeBrunner, Glover,
Meldahl, Mitchell, Somers, and Teeter
Adjunct Professor Mexal
Adjunct Associate Professors Boyer and Pitcher
Adjunct Assistant Professors Carter, McMahon, Michael, Miller, and Thornton

200. **INTRODUCTION TO FORESTRY AND FOREST PRODUCTS (3). LEC. 3.** Historic development of forestry and forest products professions, career opportunities, and current technical, social, and economic issues influencing forestry and forest products.
220. **COMPUTER APPLICATIONS IN FORESTRY (3). LEC. 2, LAB. 3.** Pr., MH 169. An introduction to computer programming using microcomputers and BASIC language. Mainframe and telecommunications are introduced.
301. **DENDROLOGY I (3). LAB. 9.** Pr., BI 102, Summer. Taxonomy and identification of important forest plants of the United States.
305. **FIELD MENSURATION (4). LAB. 12.** Pr., MH 169. Summer. Basic concepts and procedures for measuring trees and stands, units of measure used in forestry; application of log rules and volume tables; condition class mapping; elementary timber estimating.
307. **INTRODUCTION TO FORESTRY OPERATIONS AND MANAGEMENT (3). LEC. 1, LAB. 6.** Pr., FY 200, MH 169, BI 102. Summer. Exposure to important principles of forest management with particular emphasis on management and operations carried on by varying kinds of forest land ownerships.
312. **DENDROLOGY II (2). LEC. 1, LAB. 3.** Pr., FY 301. Fall. A continuation of FY 301, providing further practice in field identification of woody plants with coverage of additional species. Forest cover of each forest region of North America is described in terms of species composition and natural species groupings.
315. **FOREST MEASUREMENTS THEORY (3). LEC. 2, LAB. 3.** Pr., FY 220, 305, FYE 304, MH 169. Fall. Theoretical mensuration, height, and diameter measurement devices, measurement of area and volume, and product estimation.
316. **FOREST INVENTORY AND PROCESSING (3). LEC. 2, LAB. 3.** Pr., FY 315, BST 215. Winter. Sampling theory, sampling design, condition class mapping, and selection and use of inventory processors.
317. **FOREST GROWTH AND YIELD (3). LEC. 2, LAB. 3.** Pr., FY 316. Spring. Factors influencing growth, methods of expressing growth, growth curves, ring counts, stem analysis, stand structure, density and stocking, site evaluation, response to management practices, stand table projection simulation models (selection and use).
320. **FOREST TREE PHYSIOLOGY (3). LEC. 3.** Pr., CH 104, FY 301, PS 200 or COI. Fall, Winter. Relationship between environmental and genetic factors. Metabolism and growth of individual trees.

**The prerequisites may be waived by consent of the instructor concerned, for junior and senior students in other departments.

350. **FORESTRY FOR WOODLAND OWNERS (5).** LEC. 5. Pr., sophomore standing. Fall, Winter, Spring, Summer. (Not open to students in Forestry curricula.) Understanding trees and their value in our economy. The application of forestry principles to management of small woodlands.
400. **FORESTRY TOUR (1-3).** LAB. (2-9). Tours up to 2 weeks long to points of outstanding interest to foresters. May be taken more than once if different tours are involved.
417. **FOREST PHOTOINTERPRETATION AND REMOTE SENSING (3).** LEC. 2, LAB. 3. Pr., MH 161, FYE 304. Geometry of and measurement from vertical aerial photographs; the use of aerial photographs and other remote sensory techniques in forestry.
422. **FOREST GEOGRAPHY (2).** LEC. 2. Pr., or Coreq. FY 423. Winter, Spring. Silvical characteristics of specific tree species. Major forest types of the U.S.
423. **FOREST ECOLOGY (4).** LEC. 3, LAB. 3. Pr., AY 305, FY 316, 320, or COI. Spring. Basic concepts and principles of forest ecology including forest community-environment relationships.
425. **ARTIFICIAL FOREST REGENERATION (3).** LEC. 2, LAB. 3. Pr., FY 523 or COI. Presentation and discussion of current problems and practices involved in establishment of plantations in the Southern U.S. Principles of nursery management, tree improvement, seedling symbiology, seedling establishment, vegetation management, and site interactions.
427. **AIR POLLUTION EFFECTS ON FORESTS (4).** LEC. 3, LAB. 3. Pr., FY 320 and 423, or COI. Basic concepts of air pollution effects to forested ecosystems with emphasis on sources, transport, mechanisms of toxicity and relationships to other environmental stresses.
429. **FOREST SOILS (4).** LEC. 3, LAB. 3. Pr., AY 305 and FY 523. Use of soil science principles in forest management. Principles of forest site evaluation, forest land, classification, nutrient cycling, forest fertilization, erosion control, forest soil degradation and plant establishment.
444. **FOREST FIRE CONTROL AND USE (2).** LEC. 1, LAB. 3. Pr., FY 423 or COI. Use of fire in land management and protection of forest from wild fire.
446. **FOREST PESTS (4).** LEC. 3, LAB. 3. Pr., BI 101, 102, FY 320, junior standing. Major disease and insect pests affecting forest stands, plantations, seed orchards, and nurseries. Course covers management alternatives available for control of these pests.
460. **WILDLAND RECREATION PHILOSOPHY AND POLICY (3).** LEC. 3. Spring. Philosophy and policy of wildland recreation. Laws and traditions at federal, state, and local levels of government as well as industrial and other landowners' outlooks and developments relative to wildland recreation.
463. **FOREST RECREATION PLANNING AND MANAGEMENT (2).** LEC. 2. Pr., FY 301, 307, or COI. Planning for and management of lands which can provide recreational opportunity for people.
465. **URBAN FORESTRY (3).** LEC. 2, LAB. 3. Pr., BI 102. Principles and concepts of tree establishment, management, and health in an urban environment. Case studies of urban forestry programs.
482. **WOOD PROCUREMENT (2).** LAB. 4. Pr., FY 541 or COI. Spring. Principles, problems, and practices involved in providing raw material to the forest products industry.
483. **INDUSTRIAL WOOD PROCUREMENT PRACTICUM (1).** LAB. 3. Pr., FY 305. Coreq., FY 316. Spring. Field and office procedures and strategies involved in purchasing wood for an industrial forestry firm. Course may be taken twice for credit. S/U grading only.
484. **FOREST MANAGEMENT PRACTICUM (4).** LEC. 2, LAB. 6. Pr., FY 541. Definition, analysis, and solution of forestry problems. Requires integration of previously learned forestry material in an economic decision making framework.
495. **DIRECTED STUDY (1-5 each).** Pr., COI, and approval of department head, junior standing. Maximum of 10 hours in all areas as credit toward the Bachelor of Science degree. Areas of study defined as in FY 691.
499. **HONORS PROJECT (2-5).** Senior standing. A problem in the student's area of interest. Will test ability to do thorough library research, field work, data analysis, or other tasks related to high level independent work.

ADVANCED UNDERGRADUATE AND GRADUATE

523. **SILVICULTURE (4).** LEC. 3, LAB. 3. Pr., FY 423 or senior standing and COI. Methods of controlling establishment, composition, growth, and quality of forest stands. Application of ecological principles to manipulation of forest ecosystems to meet specific objectives.
524. **FOREST WATERSHED MANAGEMENT (2).** LEC. 2. Pr., FY 423 or senior standing and COI. A survey of forest hydrology as a specialized branch of ecology. The use of forests and forestry practices for the regulation of streamflow. An overnight field trip is required.
540. **FOREST ECONOMICS (4).** LEC. 3, LAB. 3. Pr., EC 202 or AEC 206, FY 317, or COI. Fall. Marginal analysis applied to forestry. Investment theory and forestry decisions. Theories of resource supply and economics of conservation. The structure and performance of forest products markets. The principles and influence of taxation in forestry. The U.S. as a component of the world forest economy.
541. **FOREST MANAGEMENT AND ADMINISTRATION (4).** LEC. 3, LAB. 3. Pr., FY 523, 540. Winter. A modern course in quantitative approaches to decision making in forestry. Models for forest regulation, multiple objective planning, and other selective forestry problems. Decision making in private and public forestry firms/agencies. The administration of large forestry programs and the influence of outside regulations. Course will rely heavily on previous forestry courses.
543. **FOREST POLICY (2).** LEC. 2. Pr., FY 541 or COI. Historical review of U.S. Forest Policy. Analysis of social and resource characteristics that have shaped policy issues/decisions at regional and national levels.

548. **ADVANCED FOREST ECONOMICS (3).** LEC. 3, Pr., FY 540. Winter. Input-output relationships in forest production. Computation of financial maturity of trees and stands. Competition for resources in the management of forest properties. Uses of land and evaluation of intangible values associated with land.
590. **SEMINAR IN FORESTRY (1).** Pr., senior standing. Advanced current literature and recent developments, with written and verbal reports on selected problems.
593. **PRACTICUM (1-5).** May be repeated not to exceed 10 hours credit. Not open to majors in Forestry curricula. Provides students with experience in Forestry closely relating theory and practice, usually carried out simultaneously.

GRADUATE

610. **FOREST TREE IMPROVEMENT (5).** LEC. 4, LAB. 3, Pr., ZY 300 or COI. Principles of heredity as applied to forest trees and their management. Review of current knowledge in tree improvement. Principles of forest tree breeding. Study and evaluation of activities designed to produce genetically improved trees.
611. **ADVANCED FOREST SOILS (5).** LEC. 3, LAB. 6, Pr., AY 305 or 307. Importance of morphological, physical and chemical properties of forest soils in relation to growth of trees. Classification of forest soils on the basis of productivity. Special emphasis on forest soils in the southern pine region.
613. **FOREST COMMUNITY INVESTIGATIONS (5).** LEC. 2, LAB. 8, Pr., GL 110, or AY 307 or 305; FY 423 or BY 513. Methods of detecting, measuring, describing and analyzing forest communities and community types. Application to the study of forest ecosystems.
641. **ECONOMICS OF FORESTRY I (3).** LEC. 3, Pr., EC 601 or COI. Economics of forestry in relation with natural resource economics, capital theory and investment analysis in forestry contexts, principles of decision making, scheduling forest management activities.
642. **ECONOMICS OF FORESTRY II (3).** LEC. 3, Pr., EC 601 or COI. Forest resource supply models, demand for forest products, structure, and performance of U.S. forest industry, and international forestry.
643. **ECONOMICS OF FORESTRY III (3).** LEC. 3, Pr., EC 601 and EC 556 or COI. Regional analysis of U.S. forest economy, economic and legislative history of American forestry, analysis of public and private forest policies including forest taxation.
690. **GRADUATE SEMINAR (1).** Pr., graduate standing. Presentation and discussion of advanced topics in forest management, forest engineering, and forest products.
691. **DIRECTED STUDY (1-5).** Directed Study limited to a maximum of 5 hours in any specified area and to a maximum of 15 hours in all areas as credit towards Master's or Doctoral degrees. All quarters. Areas of Directed Study: (A) Forest Management, (B) Forest Economics, (C) Forest Sampling, (D) Regression Analysis, (E) Linear Programming, (F) Forest Photogrammetry, (G) Forest Mensuration, (H) Forest Engineering, (I) Forest Soils, (J) Forest Ecology, (K) Forest Genetics, (L) Tree Physiology, (M) Wood Anatomy & Quality, (N) Uses of Wood & Derived Products, (O) Chemistry of Wood Glues, Finishes, & Impregnants, (P) Timber Physics, (Q) Recreation, (R) Remote Sensing, and (S) Wood Procurement.
695. **SPECIAL PROBLEMS (3-8).** Area of study defined in FY 691. All quarters. A special problem in forestry or wood utilization. Such a problem will be of lesser magnitude than a thesis but will test the student's ability to do thorough library research as well as any needed laboratory or field work, and to prepare a comprehensive report on his findings. This work may be spread over more than one quarter, but shall be limited to a total of eight quarter hours.
698. **MASTER OF FORESTRY PAPER (CREDIT TO BE ARRANGED.)**
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
791. **DIRECTED STUDY (1-5).** Directed Study limited to a maximum of 5 hours in any specified area and to a maximum of 15 hours in all areas of credit toward the Doctor of Philosophy degree. All quarters. Areas of Directed Study: (A) Forest Management; (B) Forest Economics; (C) Forest Sampling; (D) Regression Analysis; (E) Linear Programming; (F) Forest Photogrammetry; (G) Forest Mensuration; (H) Forest Engineering; (I) Forest Soils; (J) Forest Ecology; (K) Forest Genetics; (L) Tree Physiology; (M) Recreation; (N) Remote Sensing and (O) Wood Procurement.
795. **SPECIAL PROBLEMS (3-8).** Area of Study Defined as in FY 791. All quarters. A special problem in forestry. Such a problem will be of lesser magnitude than a thesis but will test the student's ability to do thorough library research as well as any needed laboratory or field work, and to prepare a comprehensive report on his findings. This work may be spread over more than one quarter, but shall be limited to a total of eight quarter hours.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Forest Products (FP)

Professors Biblis, Haygreen, and Tang
Associate Professors Beals, Carino, and Elder
Adjunct Professor Soltis
Adjunct Assistant Professors Hse and Price

206. **WOOD MEASUREMENTS (3).** LEC. 2, LAB. 3, Pr., MH 161. Fall. Wood measurements and tree identification oriented toward the needs of students in Forest Products and Wood Science.
301. **INTRODUCTION TO FOREST PRODUCTS AND WOOD SCIENCE (5).** LEC. 5. (Not open to students in Forestry curricula.) Introduction to fundamentals in Wood Science and Technology; Utilization and manufacture of major forest products.

302. **WOOD AND WOOD PRODUCTS IN FURNITURE AND HOUSE INTERIORS (3).** LEC. 3. Spring. Present an understanding of the relationship between the properties of various wood materials and their function when used as components of furniture and house interiors.
311. **STRUCTURE OF WOOD (5).** LEC. 3, LAB. 6. Spring. Structure of woods at macroscopic and microscopic level, emphasizing microstructure of cell wall and its effect on wood properties. Introduction to microtechniques.
330. **SOLID WOOD PRODUCTS (3).** LEC. 3. Pr., FP 311. Winter. Manufacturing, specifications, and grading of solid wood products derived from forest lands. Field trips will be required.
339. **WOOD IDENTIFICATION AND PRODUCTS (3).** LEC. 2, LAB. 3. Pr., FY 301. Winter. The manufacture of lumber, plywood, paper, and various composition boards from wood. Modern production technologies used in forest products industries. Identification of important products and woods.
370. **WOOD AS AN ART MEDIUM (3).** LEC. 1, LAB. 4. For students majoring in the Fine Arts. Winter. Basic technology and properties of wood as applied to its use as an art medium. Wood identification, design of wood forms, and effects of moisture on the dimensional stability of wood. Design problems involving wood.
474. **WOOD GLUING AND COATING (3).** LEC. 2, LAB. 3. Pr., FP 311, FP 330. Concurrently. Winter. Types and characteristics of adhesives and wood coating materials. Use of adhesives and wood coating materials in primary and secondary wood products manufacture operations.
475. **WOOD-BASED PANEL TECHNOLOGY (3).** LEC. 2, LAB. 3. Pr., FP 311, FP 330. Spring. Design, manufacture, properties and application of plywood, particle-board, fiberboard and composite panels.
477. **PULP AND PAPER TECHNOLOGY (3).** LEC. 2, LAB. 3. Pr., FP 311. Fall. Pulping processes, fiber refining and processing, manufacture of paper, fiber and paper properties, recycling of paper and water requirements, and effluent treatment.
478. **INTRODUCTION OF WOOD CHEMISTRY (4).** LEC. 3, LAB. 3. Pr., CH 203, FP 311. Winter. Chemical composition of wood, chemical analyses of wood components and their derivatives and utilization. Energy from wood and forest residues.

ADVANCED UNDERGRADUATE AND GRADUATE

513. **MICROTECHNIQUES OF HARD MATERIALS (5).** LEC. 1, LAB. 12. Pr., FP 311 or COI. Preparation and sectioning of hard materials for microscopic study. Care and use of the sliding microtome and diamond saw, staining, counterstaining and mounting of sections.
525. **PHYSICAL PROPERTIES OF WOOD (4).** LEC. 3, LAB. 3. Pr., PS 206, FP 311. Fall. Wood-moisture relationships, diffusion, permeability, plasticization, density and specific gravity. Thermal, electrical and acoustical properties of wood.
531. **MECHANICAL PROPERTIES OF WOOD (4).** LEC. 3, LAB. 3. Pr., FP 311. Winter. Mechanical properties of wood, factors affecting the strength of wood, principles used in design of wood structure. Testing procedures.
532. **DETERIORATION AND WOOD TREATING PROCESSES (3).** LEC. 3. Pr., FP 311. Fall. Biological deterioration of wood and wood products. Wood preservatives and industrial treating processes of wood products. Field trips will be required.
533. **WOOD DRYING PROCESSES (3).** LEC. 2, LAB. 3. Pr., FP 525. Winter. Physical principles of kiln drying, industry drying methods and procedures, drying defects and its prevention.
534. **MECHANICS & STRUCTURAL DESIGN WITH WOOD PRODUCTS (4).** LEC. 3, LAB. 3. Pr., FP 475, FP 531. Spring. Engineering design and mechanical behaviors of solid wood and composite wood structural members as applied to building construction.
535. **FOREST PRODUCTS PRODUCTION MANAGEMENT AND CONTROL (3).** LEC. 2, LAB. 3. Pr., FP 475, MN 310. Spring. The concepts, techniques and functions of forest products production management and manufacturing process control. Use of computer for process simulation and analysis.
536. **FOREST PRODUCTS MARKETING (3).** LEC. 3. Pr., FP 330, FP 475. Winter. Historical and current analyses of forest products marketing at manufacturing, wholesale and retail level. Applications of marketing systems to forest products industries.
537. **POLLUTION PROBLEMS IN THE FOREST INDUSTRY (3).** LEC. 3. Senior standing. Spring. Causes and control of pollution problems associated with forest industries. Air, water, noise and solid-waste problems are identified during the conversion of wood and forest residues into forest products and energy. Special topics from industrial members.

GRADUATE

601. **ADVANCED WOOD CHEMISTRY (5).** LEC. 3, LAB. 6. Pr., FP 478 or COI. Spring. Detailed study of the physical and chemical nature of cellulose and modified cellulose and their derivatives. Study of the lignocellulose complex. The chemical analysis of wood.
602. **ADVANCED WOOD ANATOMY (4).** LEC. 3, LAB. 3. Pr., FP 311. Winter. Physico-chemical properties of wood and fibers as related to ultra-structures and composition. Application of various techniques in microscopy to wood anatomy.
603. **PHYSICS OF WOOD AND WOOD COMPOSITES (4).** LEC. 4. Pr., FP 525. Fall. Theory of permeability and transport in wood. Hygrothermophysics of wood and its composites. Acoustics of timber and wood composite structures, and piezoelectric properties of wood.
604. **MECHANICS OF WOOD AND WOOD COMPOSITES (4).** LEC. 4. Pr., FP 531, ME 207 or COI. Spring. Micro- and macromechanical behavior of wood and its composites. Stress-strain relationships in wood fibers and wood composites. Phenomena of fracture and fatigue in wood and its composites.

605. **ADHESIVE BONDING OF WOOD COMPOSITES (4). LEC. 3, LAB. 3.** Pr., FP 531, FP 474. Winter. Theory of adhesion and technology of adhesive bonding. Practice of manufacturing composition wood materials and its bonding strength evaluation.
606. **ADVANCED FOREST PRODUCTS PRODUCTION MANAGEMENT AND CONTROL (4). LAB. 3, LAB. 3.** Pr., FP 535. Fall. Mathematical models in operational research, with applications to the problems in forest products industries such as manufacturing processes, production control, forecasting, inventory analysis and decisions analysis.
691. **DIRECTED STUDY (1-5).** Directed study limited to 5 hours in any specified area and to a maximum of 15 hours in all areas as credit towards the Master's or Doctoral degrees. Areas of Directed Study: (a) Physical, (b) Chemical, (c) Mechanical Properties of Wood, and (d) Processing of Forest Products.
695. **SPECIAL PROBLEMS (3-8).** Areas of study defined in FP 691. A special problem in forest products/wood science. Such a problem will be of lesser magnitude than thesis but will test the student's ability to do thorough library research as well as any needed laboratory or field work, and to prepare a comprehensive report on his findings. This work may be spread over more than one quarter, but shall be limited to a total of eight quarter hours.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
791. **DIRECTED STUDY (1-5).** Directed study limited to 5 hours in any specified area and to a maximum of 15 hours in all areas as credit toward the Doctoral degree. Areas of Directed Study: A. Physical; B. Chemical; C. Mechanical Properties of Wood, and D. Processing of Forest Products.
795. **SPECIAL PROBLEMS (3-8).** Areas of study defined in FP 791. A special problem in forest products/wood science. Such a problem will be of lesser magnitude than thesis but will test the student's ability to do thorough library research as well as any needed laboratory or field work, and to prepare a comprehensive report on his findings. This work may be spread over more than one quarter, but will be limited to a total of eight quarter hours.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Geography (GY)

Professor Martinson, Head,
Associate Professors Dawsey and Jeane
Assistant Professors Bagwell and Icenogle

102. **WORLD GEOGRAPHY (5).** Important characteristics of the land and people of the major regions of the world.
214. **PHYSICAL GEOGRAPHY (5).** Selected elements of the earth's physical system to include such items as landforms, basic weather elements, soils, and vegetation.
215. **CULTURAL GEOGRAPHY (5).** Selected elements of cultural geography to include basic concepts, review of literature, and influence of man in changing the face of the earth.
300. **WEATHER AND CLIMATE (5).** Weather and climate: causes and controls. Characteristics and distribution of world climates and their economic and social effects. Not open to students having credit for GY 213.
302. **ECONOMIC GEOGRAPHY — COMMODITY PRODUCTION (5).** Distribution and environmental relationships of man's principal economic activities.
303. **THE SOVIET UNION — LAND AND PEOPLE (5).** Survey of the physical environment and cultural development of the region. Natural resources, economic activities, social patterns, political processes, problems, and prospects of the Soviet Union.
304. **LATIN AMERICA — LAND AND PEOPLE (5).** Survey of the physical environment and cultural development of the region. Natural resources, economic activities, social patterns, political processes, problems, and prospects of the major Latin American countries.
305. **THE UNITED STATES AND CANADA — LAND AND PEOPLE (5).** Survey of the region incorporating physical and cultural elements which provide a synthesis of the economic and political processes, developments and prospects for the United States and Canada.
306. **EUROPE — LAND AND PEOPLE (5).** Regional analysis of Europe from a systematic viewpoint, including among others the physical environment, population distribution, religion, politics and economics. Selected nations will be used for case studies within their regional setting and to illustrate Europe's global relationships.
307. **A GEOGRAPHY OF SOUTH AND SOUTHWEST ASIA (5).** An intensive area study of South and Southwest Asia giving a contemporary geographic profile based on the nations' history, physical resource base, social development and economy.
308. **AFRICA — LAND AND PEOPLE (5).** Survey of the physical and cultural geography of Africa with emphasis placed on the regions and countries of greater economic and international importance.
309. **A GEOGRAPHY OF EAST AND SOUTHEAST ASIA (5).** An intensive area study of East and Southeast Asia designed to produce a contemporary geographic profile based on the nations' history, physical resource base, social development and economy.
313. **COASTAL CLIMATOLOGY. (2 SM HRS., 3 QTR. HRS.)** An introduction to the physical factors which result in climatic conditions of coastal regions, with emphasis on the northern Gulf of Mexico. No prerequisites.
315. **ALABAMA — LAND AND PEOPLE (5).** Survey of the physical environment and cultural development of the state. Natural resources, economic activities, social patterns, problems, and prospects of the state in its regional setting will be covered.
350. **FRANCE — A GEOGRAPHIC PROFILE (5).** An intensive area study of France designed to produce a contemporary geographic profile based in the nation's history, physical resource base, social development and economy.

360. **LOCATION ANALYSIS (5).** Introduction to the location of economic activity. Analysis of the key variables and a survey of useful techniques for making locational choices.
399. **INDEPENDENT READINGS IN GEOGRAPHY (1-6).** May be repeated for a maximum of 6 hours credit. No more than 5 hours may be taken at one time. Course consists of directed readings and reports on topic approved by professor in charge.
400. **HISTORY OF GEOGRAPHIC THOUGHT (3).** The development of modern geographic thinking with special attention to the methodology employed in the science of geography.
401. **THE GEOGRAPHY OF INTERNATIONAL RELATIONS (5).** General elective. The interaction between the natural-physical environment and the international activities of world powers. Emphasis on the changing geographic and economic patterns in world affairs.
440. **CARTOGRAPHY (5).** Techniques of map construction, with attention given to both the drafting and interpretation of maps and other graphic presentations.

ADVANCED UNDERGRADUATE AND GRADUATE

504. **ADVANCED PHYSICAL GEOGRAPHY (5).** Pr., COI or GY 214. Geomorphological approach to the study of landforms in addition to indepth analysis of earth systems.
505. **ADVANCED CULTURAL GEOGRAPHY (5).** Pr., COI or GY 215. Analysis of selected themes within the general field of cultural geography that illustrate man-land relationships.
507. **RESOURCES AND ENVIRONMENT (5).** An examination of the relationship between man and his physical environment emphasizing his use of natural resources and his impact on the land, sea, and atmosphere.
510. **ALABAMA — RESOURCES AND PROBLEMS (5).** Inventory and problematic aspects of Alabama resources, both human and natural. Students having credit for GY 315 will not be permitted to register for credit in GY 510.
520. **URBAN GEOGRAPHY (5).** The location, character, and growth of urban centers, with special attention to their interior patterns of land use and cultural development.

GRADUATE

600. **SEMINAR IN CULTURAL GEOGRAPHY (5).** Pr., COI, or graduate standing. Designed for intensive study and analysis of selected themes within the broad field of cultural geography.
650. **GEOGRAPHY SEMINAR (5-10).** Pr., COI or graduate standing. Designed for students in intensive study and analysis of problems in geography.

Geology

Professors Cook, Head, Carrington, and Gastaldo

Associate Professor King

Assistant Professors Bittner, Chalokwu, Lewis, Salpas, and Savrda

101. **INTRODUCTORY GEOLOGY I (5).** LEC. 4, LAB. 2. All quarters. The origin and classification of rock-forming and ore minerals. Sedimentary, metamorphic, and igneous processes, and classification of rocks that result from such processes. Rock deformation and mountain building. Not open to students having credit in GL 110 or 315 or to students in the College of Sciences and Mathematics.
102. **INTRODUCTORY GEOLOGY II (5).** LEC. 4, LAB. 2. Pr., GL 101. All quarters. Geomorphology through study of weathering, mass movement, formation of soils, and the erosional, transportation, and depositional aspects of groundwater, streams, oceans, glaciers, and wind. Not open to students having credit in GL 110 or 315 or to students in the College of Sciences and Mathematics.
103. **HISTORICAL GEOLOGY (5).** LEC. 4, LAB. 2. Pr., GL 102 or 110. Spring. Physical and biological history of the earth, with emphasis on the evolution of life forms.
105. **GEOLOGY OF THE NATIONAL PARKS (3).** LEC. 3. Winter. The examination and discussion of the geologic processes responsible for the unique characteristics of selected National Parks based on their description as "Geologic features worthy of preservation and protection" by the U.S. Department of the Interior.
106. **GEOLOGY OF OUR SOLAR SYSTEM (3).** LEC. 3. Winter. Examination of our sun and its planets from the geologist's perspective by the use of recently acquired data from manned and unmanned sample-return missions, remote geochemical and geophysical experiments, and remotely-sensed photogeology.
110. **PHYSICAL GEOLOGY (5).** LEC. 4, LAB. 2. All quarters. An accelerated course in general geology for the student with an interest and/or aptitude in natural sciences. Survey of the important minerals and rocks with emphasis on the processes that effect their formation and destruction. Origin and classification of geologic structures. Not open to students having credit in GL 101, GL 102 or 315.
205. **PALEOBOTANY (5).** LEC. 4, LAB. 2. Pr., BI 102, sophomore standing. Fall. Taphonomic processes responsible for the generation of plant-bearing lithologies, hydrocarbon accumulating systems, biostratigraphic assemblages, paleoecological restorations of the Phanerozoic, and evolution of plant groups.
206. **INVERTEBRATE PALEOZOOLOGY (5).** LEC. 4, LAB. 2. Pr., BI 103, sophomore standing. Winter. Morphology, classification, and significance of selected genera representative of the diversity of fossil invertebrates, including microscopic fossils.
215. **GEOLOGICAL FIELD METHODS (6).** LAB. 12. Pr., GL 110 or equiv., GL 240 and TS 102 or coreq. Summer. Instruments and methods used in geological field mapping. Final report required.

- 231. INDEPENDENT GEOLOGICAL MAPPING (2).** LAB. 5. Pr., GL 215, sophomore standing. All quarters. Independent mapping project of limited extent done with the consent and under the direction of a faculty member. A geological map and report must be completed, summarizing the investigation of the area chosen.
- 240. STRUCTURAL AND GEOTECTONIC PRINCIPLES (5).** LEC. 3, LAB. 4. Pr., GL 102, 110 or 315. Spring. Principles and processes of rock deformation, including description and classification of rock structures and methods of analysis. General history of the development of North America through understanding of plate structural developments.
- 301. MINERALOGY (5).** LEC. 4, LAB. 2. Pr., CH 103, junior standing. Fall. Introduction to crystal chemistry and crystallography. Systematic study of representatives of important metallic and non-metallic mineral groups.
- 302. OPTICAL MINERALOGY (5).** LEC. 4, LAB. 2. Pr., GL 301, junior standing. Winter. Theory and application of polarized light optics as applied to mineral identification, with emphasis on the study of rock-forming silicate minerals in thin sections.
- 305. IGNEOUS AND METAMORPHIC PETROLOGY (5).** LEC. 4, LAB. 2. Pr., GL 302 and CH 105, junior standing. Spring. Principles and processes of intrusive and extrusive igneous activity and metamorphism. Description and classification of igneous and metamorphic rocks.
- 315. ENGINEERING GEOLOGY (4).** LEC. 3, LAB. 2. Pr., junior standing. All quarters. Fundamental geological principles, materials and features that affect engineering projects and programs. Emphasis on pre-construction geological analysis in recognition of potential construction and post-construction hazards and problems. Not open to students having credit in GL 101, 102, or 110.
- 401. SEDIMENTARY PETROLOGY (5).** LEC. 4, LAB. 2. Pr., GL 302 and CH 105, junior standing. Fall. Detailed description and classification of sedimentary rocks, with emphasis on the processes of sediment transportation, deposition and diagenesis in marine and non-marine environments.
- 411. STRATIGRAPHY (5).** LEC. 4, LAB. 2. Pr., GL 205, 206, 240 and 401, junior standing. Winter. Descriptive geology pertaining to the discrimination, character, thickness, sequence, age, and correlation of rocks. Particular emphasis on field study of stratified rocks.
- 421. ECONOMIC GEOLOGY (5).** LEC. 4, LAB. 2. Pr., GL 240, 305 and 401, junior standing. Spring. The origin, distribution and classification of mineral deposits formed by igneous, metamorphic and sedimentary (or secondary) processes. Introduction of methods of exploration and development.
- 431. RESEARCH METHODS AND APPLICATION (1-4).** Pr., senior majoring in geology and/or consent of departmental faculty upon receipt of acceptable proposal. All quarters. Active participation in some phase of original research under supervision of a senior investigator. Credit evaluation determined by the departmental faculty on the basis of the formal presentation of the problem and the probable method(s) of investigation. May be taken more than one quarter for a maximum cumulative credit of four credit hours.
- 480. DIRECTED STUDY (1-3).** Pr., COI. All quarters. Directed studies in areas of geology not covered by an existing course, or to supplement knowledge gained from an existing course. The study may incorporate literature and/or laboratory research in any proportion. The subject matter and credit hour value for the course shall be agreed upon by the student and directing faculty member prior to enrollment. A written report is required. May be taken more than one quarter.

The following courses are available during Summer quarters at the Dauphin Island, Alabama, Sea Laboratory, and at the Gulf Coast Research Laboratory, Ocean Springs, Mississippi. Application forms must be obtained from the Department of Geology during final registration for the Winter Quarter preceding intended attendance.

COURSES AT DAUPHIN ISLAND SEA LABORATORY

- 120. MARINE TECHNICAL METHODS I (3).** LAB. 8. Summer only. Pr., COI. Introduction to instruments and procedures utilized aboard marine research vessels, including physical, biological and geological measurements and sampling techniques.
- 121. MARINE TECHNICAL METHODS II (3).** LAB. 8. Summer only. Pr., COI. Introduction to laboratory methods associated with chemical parameters of "nutrient analysis." Shipboard and practical skills developed.
- 202. INTRODUCTORY MARINE GEOLOGY (6).** LEC. 4, LAB. AND FIELD 4. Summer only. Pr., Physical Geology and COI. Sedimentary environments, seafloor topography and history of ocean basins. Sampling and laboratory techniques and relationship of biota to sediment substrate.
- 501. RECENT MARINE SEDIMENTATION (6).** LEC. 4, LAB. 4. Summer only. Pr., GL 202 or ZY 201 or ZY 330 or COI. Properties of marine sediments, coastal environments, continental margins, reefs, and the deep sea. Monitoring and measuring of shoreline changes.
- 502. PROBLEMS IN MARINE PALEOECOLOGY (6).** LEC. 4, LAB. 4. September Preterm, alternate years. Pr., GL 101-102 (or GL 110) and GL 206 or COI. Survey of principal Mesozoic and Cenozoic marine fossil groups, their paleoecology, and paleogeography.

COURSES AT GULF COAST RESEARCH LABORATORY

- 440. PHYSICAL MARINE GEOLOGY (5).** LEC. 2, LAB. 5. Pr., consent of departmental adviser, junior standing. Summer only. General introduction to the physical processes resulting in the coastal morphology of Mississippi Sound, emphasizing erosional and depositional effects of waves and currents. Various environmental types (deltas, estuaries, etc.) and their characteristics are studied. Identification of ancient shorelines and ancient environments.

- 441. CHEMICAL MARINE GEOLOGY (5). LEC. 2, LAB. 5.** Pr., consent of departmental adviser, junior standing. Summer only. Overview of the chemical systems in the oceans, with special emphasis on near-shore marine and estuarine environments. Basic analytical methods currently used to study the marine environment, with a strong concentration on instrumental methods of analyzing natural waters and sediments. Supervised research on chemical systems in the local estuaries, Mississippi Sound, and offshore.

ADVANCED UNDERGRADUATE AND GRADUATE

- 505. PRINCIPLES OF ANALYTICAL GEOCHEMISTRY (3). LEC. 2, LAB. 2.** Pr., GL 302 or COI. Fall. Basic principles of x-ray diffraction/fluorescence and atomic absorption spectrophotometry, neutron activation will be discussed. Emphasis will be on the utilization of these techniques in the analysis of geological materials.
- 540. PRINCIPLES OF EARTH SCIENCE (5). LEC. 3, LAB. 4.** Summer only. A special course in earth science for in-service and future teachers only. The subject matter encompasses internal surficial geology, meteorology, and oceanography. It stresses theory and applications and includes both indoor and field laboratories. Not open to undergraduates with credit in GL 101, 102, or 110. GL 540 is not a substitute for those courses.
- 550. SEDIMENTARY DEPOSITIONAL SYSTEMS (4). LEC. 3, LAB. 2.** Pr., GL 401 and 411 or equivalents. Fall. Systematic study of the sedimentology and facies stratigraphy of modern and ancient depositional systems. The course covers terrigenous-detrital and carbonate depositional environments. The course emphasizes analysis of the current literature and field work.

GRADUATE

- 600. PRINCIPLES OF GEOCHEMISTRY (5). LEC. 3, LAB. 4.** Pr., CH 105 or equiv. and MH 163. Fall. Fundamentals of chemical concepts as applied to geologic processes and solution of geologic problems. Survey of origin and distribution of elements in the solid earth. Laboratory emphasizes specific problems related to student's research and/or interests.
- 605. ADVANCED PALEOBOTANY (4). LEC. 2, LAB. 4.** Pr., GL 205 or COI. Spring. Process oriented course to examine the development of plant-bearing and plant-generated organic-rich sediments of modern and ancient depositional environments. Modern analog studies will be used as a basis for interpreting ancient plant-bearing lithologies. Two 3-day field laboratories are required.
- 606. MICROPALAEONTOLOGY (5). LEC. 3, LAB. 4.** Pr., BI 103, GL 103 or COI. Spring. Morphology, classification and biostratigraphic use of specific microfossil groups, including foraminifera, ostracodes and conodonts. Laboratory emphasis on collection, preparation and systematics of microfossils.
- 610. ADVANCED STRUCTURAL GEOLOGY (4). LEC. 3, LAB. 2.** Pr., GL 240. Winter. Application of analytical techniques to microscopic, mesoscopic and megascopic deformational features of rocks. Lab emphasis on solution of local problems.
- 615. DELTAIC PROCESSES (3). LEC. 2, 1 FIELD TRIP.** Pr., GL 401. Spring. Introduction to inorganic and organic sedimentological processes in deltaic deposystems. Developmental processes will be surveyed in major deltaic regimes of the world as a basis for assessment of ancient delta systems. One 3-day field trip required.
- 640. SPECIAL TOPICS IN ECONOMIC GEOLOGY (4). LEC. 3, LAB. 2.** Pr., GL 421 or COI. Fall. The practical and theoretical aspects of economic geology as applied to exploration and development of natural resources, particularly fuels, base metals and precious metals. Emphasis on specific case histories, preparation of maps and reports, and the analysis of drill-recovered, geochemical and geophysical data.
- 641. COAL TECHNOLOGY (5). LEC. 4, LAB. 2.** Pr., GL 110 or COI. Fall. Introduction to origin, occurrence, exploration, development and beneficiation of coal. Emphasis on coal petrology as applied to rank, maceral and utilization parameters.
- 650. ADVANCED STRATIGRAPHY (4). LEC. 3, LAB. 2.** Pr., GL 411. Spring. In-depth study of classical, paleontological, and/or physical stratigraphy. Emphasis on current research topics, techniques, and field work.
- 660. IGNEOUS PETROLOGY (4). LEC. 3, LAB. 2.** Pr., GL 305. Winter. Classification of igneous rocks. Origin, composition, and properties of magmas. Genesis of the major igneous rock associations. Petrochemistry.
- 661. SEDIMENTOLOGY AND SEDIMENTARY PETROLOGY (5). LEC. 4, LAB. 2.** Pr., GL 401 (or 501) and 411. Spring. Selected readings, lectures, and group discussion of significant papers on processes of sedimentation and diagenesis. Emphasis on interpreting depositional and post-depositional history of specific rocks. Analytical techniques and microscopic analysis of evaporites, carbonates, and clastics.
- 662. METAMORPHIC PETROLOGY (4). LEC. 3, LAB. 2.** Pr., GL 305. Winter. Metamorphic zones, facies and reactions. Applications of experimental data to metamorphic rock genesis. Studies of selected metamorphic rocks in the southern Piedmont.
- 670. SEMINAR I — SOUTHEASTERN GEOLOGY (1).** Fall. Reports and discussion covering general topics of regional geologic interest as well as specific geologic problems unique to the southeastern U.S. Emphasis on geologic history, economic, structural and stratigraphic topics.
- 671. SEMINAR II — APPLIED GEOPHYSICAL METHODS (1).** Winter. Reports and discussion on the theory and uses of seismic, magnetic and electrical exploration techniques.
- 672. SEMINAR III — GEOTECTONICS (1).** Spring. Reports and discussion on the principles, patterns and classification of tectonic phenomena.
- 680. A,B,C,D,E,F,G. DIRECTED STUDIES (1-5).** Pr., COI. All quarters. Non-thesis credit research in areas not currently offered as, or to supplement, lecture courses. Requires written final report. May be taken more than one quarter for a maximum cumulative credit of four credit hours. A. Economic Geology — Coal Technology. B. Geophysics. C. Igneous, Metamorphic Petrology — Geochemistry. D. Paleontology. E. Sedimentary Petrology — Stratigraphy. F. Structural Geology — Geotectonics. G. Urban and Environmental Geology.
- 699. THESIS (3-6).** All quarters. Pr., acceptance of thesis research proposal. May be taken more than one quarter.

Health Administration (HA)

(Department of Political Science)

Assistant Professors Burns and Ford

- 360. **INTRODUCTION TO HEALTH ADMINISTRATION (5).** Introduction to basic concepts and principles of administration of health services organizations.
- 370. **HEALTH ADMINISTRATION AND COMMUNITY (3).** Use of epidemiological methods in analysis of community resources, resource allocation, program implementation and general health administration. Development of appropriate strategies for effective community relations by health administrators.
- 420. **HEALTH POLICY (5).** Political issues affecting health services.
- 421. **LEGAL STRUCTURE OF HEALTH ADMINISTRATION (3).** Legal processes and aspects affecting the work of administrators of hospitals and other health services organizations.
- 450. **INTERNSHIP (10).** Pr., HSA or HSM major and junior standing. (S-U grading only). Practical administrative experience in health services organizations as arranged and approved by the HA Program.
- 451. **INTERNSHIP READING COURSE (5).** Coreq., concurrent enrollment in HA 450. Independent readings in administration of health services organizations as approved by instructor.
- 510. **HEALTH ADMINISTRATION (3).** Pr., PO 325 and HA 360, or COI. Human resources and material factors affecting administration of health services organizations.
- 530. **HEALTH ADMINISTRATION AND REGULATION (3).** Pr., HA 360 or COI. Government regulatory programs affecting administration of health services organizations.
- 531. **HEALTH ADMINISTRATION AND TECHNOLOGY (3).** Pr., HA 360 or COI. Effects of developments in modern technology on administration of health services organizations.
- 539. **TOPICS IN HEALTH ADMINISTRATION (1-5).** Pr., HA 360 or COI. Analysis of specific problems in health administration. May be repeated for a maximum of 10 hours credit.
- 550. **SPECIAL PROBLEMS IN HEALTH ADMINISTRATION (1-5).** Pr., COI. Qualified students conduct systematic investigation of selected problems in administration of health services under supervision of instructor.

Health and Human Performance (HHP)

Professors Wilson, Head, Means, Moore, Puckett, and Reeve

Associate Professors Dragoin, Ford, and Blessing

Assistant Professors Bengtson, Cherellia, Crabtree, Daniels,

Lander, Newkirk, Rosen, Waldrop, and Washington

Instructor Kepner

The purpose of the Department of Health and Human Performance is for students to develop the basic and applied principles underlying optimal health, maximum physical performance, the appropriate use of leisure time, and how to deliver this information in a school or non-school setting. More specifically, in response to societal needs and trends, the Department prepares students to become teachers of physical education (N-12), and non-school professionals in Health Promotion, Exercise Science, and Recreation and Sports Management.

PHYSICAL EDUCATION-GENERAL PROGRAM (PE)

Health Classification. A health status form provided by the department must be signed by each student prior to participation in a physical education course involving physical activity.

Physical Education Requirements: Refer to School or program requirements.

Credit. All 100- and 200- level PE courses carry two hours credit per quarter and 300-level courses carry one hour credit. (Maximum of six quarter hours allowed on degree.) No student may receive credit for a course in which the person has previously earned credit.

Students may not register for a beginning level course after having earned credit in the sport or dance area on an advanced level. Credit cannot be earned for a 200- and a 300-level course in the same sport.

To audit, students must secure approval of department head or director of physical education general program.

PHYSICAL EDUCATION SERVICE COURSES (PE)

101. **PHYSICAL FITNESS: SELF APPRAISAL (2).** Understanding of the relationship of human movement to body efficiency, aesthetics and health; self-appraisal; development of a personal plan for achieving and maintaining physical condition; selection of a personal program of developmental and recreational activities.
102. **SWIMMING FOR THE NON-SWIMMER (2).** Knowledge and skill in aquatics which are developed to a level sufficient to support a recreational interest and to assure one's own safety and the safety of others in and around water.
103. **INDIVIDUALIZED AQUATICS (2).** Provides water therapy, an understanding of adaptive movements, and aquatic skills.
104. **MOUNTAINEERING (2).** Pr., signed Army form 131. Basic climbing techniques and rappelling. Class presentations covering ropes, knots, snap links, and all associated equipment for climbers. Includes both discussion and practical exercises. Requires a weekend field training exercise with climbing and rappelling at Talladega National Forest.
105. **PISTOL MARKSMANSHIP (2).** Pr., signed Army form 131. Basic instruction and pistol firing exercises covering various shooting positions. Instruction is designed to expose the student to marksmanship as a challenging recreational sport.
107. **SPORTS AND DANCE IN AMERICAN CULTURE (2).** (ATYPICAL).
114. **SPECIAL FITNESS RELATED TOPIC (2).** Additional fee may be charged by cooperating agency.
115. **ADAPTED PHYSICAL EDUCATION (2).** Concerned with the improvement and correction of physiological and anatomical remedial defects.
116. **WEIGHT CONTROL (2).** Caloric intake-output, nutrition, and the development of desirable exercise and nutritional habits. Activities selected according to individual needs and limitations. Open to students with health classifications. "A" and "B."
117. **AEROBIC DANCE (2).**
125. **BASKETBALL (2).**
127. **SOCCER-SPEEDBALL (2).**
130. **JOGGING (2).**
131. **FENCING (2).**
132. **WRESTLING (2).**
133. **ORIENTEERING (2).** Pr., signed Army form 131. Instruction and practical application in land navigation and orienteering to include types of maps, use of lensatic and Silva compasses, determination of scale, distance, elevation and relief, map and ground orientation, field expedients for navigation, and a working knowledge of the different types of orienteering events. This course includes five hours of practical field work.
134. **JUDO (2).**
135. **WEIGHT TRAINING (2).**
136. **TRACK (2).**
137. **HANDBALL (2).**
138. **RACQUETBALL (2).**
139. **WILDERNESS SKILLS (2).** Pr., signed Army form 131. A personal confidence building course that provides an introduction to basic survival skills to include rappelling, food procurement and preparation, traps and snares, climbing techniques, hasty shelters, emergency first aid, and field expedient techniques. Course requires one weekend field trip to the Talladega National Forest.
140. **GYMNASTICS (2).** Understanding of gymnastics and skill in the use of different apparatus.
141. **TRAMPOLINE (2).**
142. **TUMBLING (2).**
144. **MODERN DANCE (2).** An understanding of dance as an art form.
145. **MODERN DANCE II (2).** Pr., PE 144 or equivalent.
146. **TAP DANCE (2).**
147. **BALLET (2).** Fundamentals and terminology of classical ballet.
148. **BALLET II (2).** Pr., PE 147 or equivalent.
149. **JAZZ DANCE (2).** Pr., COI.
150. **INTERMEDIATE SWIMMING (2).** Pr., COI.
151. **SPECIAL RECREATIONAL TOPIC (2).** Additional fee may be charged by cooperating agency.
152. **SWIMMING FOR FITNESS (2).** Pr., PE 150 or equivalent. Physical conditioning through water exercises and swimming.
153. **SPRINGBOARD DIVING (2).** Pr., COI. Instruction in the basic dives; front, back, inward, reverse, and twist.
154. **RECREATIONAL SPORTS AND ACTIVITIES (2).** Survey of selected recreational pursuits such as billiards, croquet, darts, gym bowling, hiking, horseshoes, net games, and shuffleboard.
155. **ANGLING (2).** Skills in bait and fly casting. Selection and care of tackle.

- 156. **ARCHERY (2).**
- 157. **BADMINTON (2).**
- 158. **BOWLING (2).** Additional fee payable to cooperating agency.
- 159. **GOLF (2).** Additional fee payable to cooperating agency.
- 162. **RIFLE MARKSMANSHIP (2).** Pr., signed Army form 131.
- 163. **TENNIS (2).**
- 165. **CAMPING (2).** Understanding of American heritage in relation to the out-of-doors, camping trends, conservation, and the development of camping skills.
- 166. **FAMILY RECREATION (2).** Leisure time activities suitable for the family.
- 168. **BASIC EQUITATION (2).** Additional fee payable to cooperating agency.
- 170. **FOLK DANCE (2).**
- 172. **SOCIAL DANCE (2).** Mixers, as well as ballroom dances: foxtrot, waltz, rhumba, tango, and other representative Latin dances.
- 180. **SOFTBALL (2).**
- 181. **VOLLEYBALL (2).**
- 201. **ADVANCED SURVIVAL AND MOUNTAINEERING (2).** Pr., signed Army form 131, Pr., PE 139 or PE 104 or equivalent. Topics include emergency first aid, food procurement and preparation, advanced rappelling and climbing, shelters, water sources, and field expedient techniques. Course requires a weekend field training exercise in the Talledega National Forest.
- 230. **LIFE SAVING (2).** Skills leading to certification in Red Cross Senior Life Saving.
- 231. **SKIN DIVING (2).** Pr., COI. Underwater swimming includes selection and use of swim fins, mask, snorkel. Underwater physiology and safety are emphasized.
- 234. **JUDO II (2).** Pr., PE 134 or equivalent.
- 235. **WEIGHT TRAINING II (2).** Pr., PE 135 or equivalent.
- 238. **RACQUETBALL II (2).** Pr., PE 138 or equivalent.
- 250. **SYNCHRONIZED SWIMMING (2).** Pr., COI.
- 259. **GOLF II (2).** Pr., PE 159 or equivalent. Additional fee payable to cooperating agency.
- 263. **TENNIS II (2).** Pr., PE 163 or equivalent.

VARSITY (PE)

- 325. **VARSITY BASKETBALL (1).**
- 326. **VARSITY FOOTBALL (1).**
- 332. **VARSITY WRESTLING (1).**
- 336. **VARSITY TRACK (1).**
- 337. **VARSITY CROSS COUNTRY (1).**
- 340. **VARSITY GYMNASTICS (1).**
- 350. **VARSITY SWIMMING (1).**
- 359. **VARSITY GOLF (1).**
- 362. **VARSITY RIFLERY (1).** Pr., signed Army form 131.
- 363. **VARSITY TENNIS (1).**
- 379. **VARSITY SOFTBALL (1).**
- 380. **VARSITY BASEBALL (1).**
- 381. **VARSITY VOLLEYBALL (1).**

HEALTH AND HUMAN PERFORMANCE (HHP)

- 100. **FUNDAMENTALS OF MOVEMENT (3).** Framework for human movement that allows for effective delivery of motor skills instruction by the physical education teacher.
- 102. **ORIENTATION FOR TRANSFER STUDENTS (1).**
- 118. **SKILLS AND CONCEPTS OF INDIVIDUAL AND DUAL ACTIVITIES I (3).** LAB. 6. Track and Field, archery, golf, wrestling and other individual and dual activities.
- 119. **SKILLS AND CONCEPTS OF INDIVIDUAL AND DUAL ACTIVITIES II (3).** LAB. 6. Tennis, badminton, racquetball, squash and handball.
- 120. **SKILLS AND CONCEPTS OF GYMNASTICS (3).** LAB. 6. Tumbling, trampoline and apparatus.

121. **SKILLS AND CONCEPTS OF AQUATICS (2).** LAB. 4. Strokes, survival swimming techniques, competitive swimming, springboard diving, and other aquatic activities.
122. **SKILLS AND CONCEPTS OF TEAM SPORTS I (3).** LAB. 6. Basketball, volleyball, and other indoor team sports.
123. **SKILLS AND CONCEPTS OF DANCE (3).** LAB. 6. Contemporary, folk, square, tap and ethnic dance.
124. **SKILLS AND CONCEPTS OF TEAM SPORTS II (2).** LAB. 4. Soccer, speedball, field hockey, and related outdoor team sports.
195. **HEALTH SCIENCE (2).** Basic understanding concerning sound health practices and protection. Physical, mental, and social aspects of personal and community health are considered.
200. **THEORY AND CONDUCT OF PHYSICAL ACTIVITIES (5).** LEC. 3, LAB. 4. Includes how to organize and administer individual and dual sports, team sports, gymnastics, and dance at both education and competitive levels.
201. **HISTORY AND PRINCIPLES OF PHYSICAL EDUCATION (3).**
202. **BASKETBALL (3).** LEC. 2, LAB. 2. Fundamental skill techniques of basketball — offense, defense, and strategy.
203. **BASEBALL (3).** LEC. 2, LAB. 2. Offensive and defensive strategy, pitching, catching, infielding, outfielding, batting and baserunning.
204. **TRACK AND FIELD (3).** LEC. 2, LAB. 2. Fundamental skills and techniques of track and field athletics. The organizing and conducting of track meets.
206. **FOOTBALL (3).** LEC. 2, LAB. 2. Fundamentals of football and the different types of offense, defensive team strategy and generalship.
211. **MOTOR DEVELOPMENT (3).** LEC. 2, LAB. 2. Designed to develop understandings and skills concerning the broad concept of motor development of children, ages 4-8.
213. **DANCE FOR CHILDREN (3).** LEC. 2, LAB. 2. Includes all forms of dance suitable for elementary school age children with emphasis on creative dance activities which afford a progression in dance skills.
228. **SPORTS OFFICIATING (3).** LEC. 2, LAB. 2. Basic officiating principles applicable to all sports with lab experiences and study of rules for selected sports.
280. **FOUNDATIONS OF HEALTH EDUCATION (3).** Basic theories and concepts associated with health education in all settings and health educators as change agents.
282. **INTRODUCTION TO LEISURE SERVICES (3).** History, philosophy, economic impact and scope of leisure service organizations in our society.
295. **SCHOOL HEALTH (3).**
296. **COMMUNITY HEALTH (3).**
315. **KINESIOLOGY (4).** LEC. 3, LAB. 2. Pr., ZY 250-251.
335. **EXERCISE AND SPORT PSYCHOLOGY (4).** Pr., PG 211. Examination of the role of psychological factors, including motivation, anxiety, and personality in sport and physical activity.
351. **WATER SAFETY (3).** LEC. 1, LAB. 4. Pr., current Red Cross Sr. Life Saving Certificate. American Red Cross Advanced Swimmer and Water Safety Instructor courses leading to certification.
370. **DANCE SURVEY (3).** LEC. 2, LAB. 2. Comprehensive study of dance from primitive man to current styles of dance.
372. **DANCE PRODUCTION (3).** LEC. 2, LAB. 2. Apprenticeship in producing dance programs, exhibitions of physical activity and festivals.
373. **DANCE THEATRE (1-6).** Pr., COI. Participation in rehearsal lecture demonstrations, concert work and other presentations related to dance.
384. **PARK AND RECREATION MAINTENANCE (3).** Basic maintenance principles applicable to park and recreation agencies.
386. **LEADERSHIP IN LEISURE SERVICES (3).** Pr., HHP 282. Theories, techniques, and leadership procedures applied to leisure service settings.
387. **OUTDOOR RECREATION (3).** Those recreational activities which occur in an outdoor environment and which relate directly to that environment.
388. **CAMP MANAGEMENT (3).** Introduction to the principles and applications of organized camping.
389. **RECREATION INTERPRETATIVE SERVICES (3).** Pr., HHP 282. Principles and techniques used to communicate natural, historical, and cultural features of an outdoor recreation area to park visitors. Develops the ability to gather information, create, and present an interpretative program.
392. **CONSUMER HEALTH (3).** Pr., HHP 195. Basic principles and concepts associated with the selection and use of health products, services, and health information.
394. **METHODS OF HEALTH INSTRUCTION (3).** LEC. 2, LAB. 2.
396. **DRUG USE AND ABUSE (3).** Investigation of stimulants, depressants, alcohol, narcotics, and tobacco. The effects of these substances on the human body and the social, economic, and community problems associated with their use.
400. **PROGRAMMING IN LEISURE SERVICES (5).** Pr., HHP 386. Program planning procedures, techniques, and related administrative functions for leisure service agencies.
404. **ATHLETIC INJURIES (3).**

405. **PHYSIOLOGY OF EXERCISE (4).** LEC. 3, LAB. 2. Pr., ZY 250-251. Principles of physiology with special emphasis on the application of physiological findings to practical problems related to human physical activity.
413. **TEACHING PHYSICAL EDUCATION IN ELEMENTARY SCHOOLS (3).** LEC. 2, LAB. 2. Pr., admission to teacher education for certification program.
414. **TEACHING PHYSICAL EDUCATION IN SECONDARY SCHOOLS (3).** LEC. 3, LAB. 2. Pr., admission to teacher education for certification program.
416. **ADAPTIVE PHYSICAL EDUCATION (3).** LEC. 2, LAB. 2. Pr., ZY 250, RSE 376, or COI. Review of anatomy, physiology, and psychology pertaining to special programs of physical education for the temporarily and permanently handicapped, with laboratory practice in posture training and remedial gymnastics.
423. **PROGRAM IN PHYSICAL EDUCATION (5).** Pr., admission to Teacher Education for certification program.
424. **ORGANIZATION OF INTRAMURAL SPORTS PROGRAMS (3).** LEC. 2, LAB. 2.
425. **PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, professional screening, appropriate professional courses. Provides supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled discussion periods designed to provide positive evaluation and analysis of the intern experience.
426. **EVALUATION AND MEASUREMENT IN PHYSICAL EDUCATION (3).** LEC. 2, LAB. 2. Pr., FED 400.
429. **MOTOR LEARNING AND PERFORMANCE (4).** LEC. 3, LAB. 2. Pr., PG 211. Process of motor skill acquisitions; emphasis on variables that influence motor learning and performance.
446. **DIRECTED INDEPENDENT STUDY (1-10).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
450. **SPECIAL TOPICS (1-5).** Seniors and professors pursue cooperatively selected concepts and theoretical formulations normally in small groups.
475. **HEALTH PROMOTION IN THE WORKPLACE (3).** Pr., HHP 195, 280. Principles basic to the promotion of health within businesses and corporations. Includes development and evaluation of worksite programs such as stress management, smoking cessation, weight control, physical fitness, etc.
485. **SOCIAL RECREATION (3).** The organizing, planning and implementing of social oriented activities in park and recreation settings.
486. **PARK PLANNING (3).** Pr., HHP 282. Basic design principles as related to recreation and park planning. Consideration is given to design problems and solutions in park maintenance, vandalism, visitor control and other problems of recreation resource management.
487. **PARK MANAGEMENT (3).** Pr., HHP 282. An investigation into the operation of parks and resource areas with emphasis on the managerial function of the park administrative personnel.
494. **EMERGENCY CARE AND FIRST AID (3).** LEC. 2, LAB. 2. Prevention of injuries and emergency care of illnesses and injuries. Includes cardiopulmonary resuscitation (CPR).
495. **PRACTICUM (1-10).** Provides experiences closely relating theory and practice, usually carried on simultaneously.

ADVANCED UNDERGRADUATE AND GRADUATE

505. **PRINCIPLES OF ADULT FITNESS (4).** LEC. 2, LAB. 2. Pr., HHP 405 or COI. Introduction to the basic principles of exercise testing, exercise prescription, and supervision of programs for adult populations.
510. **ADVANCED ATHLETIC TRAINING (5).** LEC. 4, LAB. 2. Pr., HHP 404 or COI. Prevention of injuries and advanced techniques of athletic training, including therapeutic modalities and injury rehabilitation.
517. **PHYSICAL EDUCATION FOR THE MENTALLY RETARDED (3).** LEC. 2, LAB. 2. Pr., HHP 211 or 212. The motor characteristics of the mentally retarded and the design of special programs of physical education; involves working with mentally retarded children.
520. **SOCIOLOGY OF SPORT (5).** Sport and culture. Attention is given to social processes and human behavior in sport situations.
527. **DANCE CONCEPTS AND RELATED CLASSROOM EXPERIENCES (5).**
570. **STRENGTH POWER TRAINING: THEORY AND PRACTICE (5).** Pr., HHP 315, 405. Theoretical and practical concepts related to strength training and the role of the strength coach.

GRADUATE

601. **HISTORY OF SPORT AND PHYSICAL EDUCATION (5).** Historical backgrounds of sport and physical education with emphasis on the development of significant trends and the contributions of specific individuals.
609. **ADVANCED HEALTH SCIENCE (4-5).** Pr., COI. Principles and concepts basic to the improvement of individual and group living and the role of the home, school, and community in the development of sound physical and mental health.
614. **PRINCIPLES OF BIOMECHANICS (5).** Anatomical and technical principles of mechanics applied to human movement. Topics include applied anatomy, linear and angular kinematics, linear and angular kinetics, and fluid mechanics.
616. **BIOMECHANICS OF SPORT INJURY (5).** Analysis of musculoskeletal factors, pathomechanics, and tissue properties that define the tolerance of the human body to the forces and torques developed in sport activities. Techniques for prevention of injury and design of protective equipment based on such information are explored.
618. **CURRENT PROBLEMS IN HEALTH EDUCATION. (4-5).** Pr., COI.

619. **SCIENTIFIC PRINCIPLES APPLIED TO PHYSICAL EDUCATION AND ATHLETICS (5).** Pr., undergraduate major or minor in health and physical education. Specific application of physics, physiology, and psychology to the development of physical skills and related topics including reaction time, motivation, maturation, illusions, morale, and problems of group social living in physical education and athletics.
625. **INTERNSHIP (5-15).** Supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences accompanied by regularly scheduled, on-campus discussion periods and evaluation and analysis of the intern experience.
626. **PHYSICAL FITNESS A CRITICAL ANALYSIS (5).** Pr., ZY 250-251 or consent of department head. Critical analysis of physical fitness objectives of physical education through inquiry into current research in medicine, physiology of muscular activity, and physical fitness appraisal and guidance.
629. **PSYCHOMOTOR FOUNDATIONS OF PHYSICAL ACTIVITY (5).** Pr., HHP 429 or COI. Overview of the relationships between psychological factors and motor performance; methods of research in the areas of motor development, motor learning, and sport psychology; reviewing experimental studies, and current issues of psychomotor research.
635. **PSYCHOSOCIAL DIMENSIONS OF SPORT (5).** Pr., HHP 629 or equivalent. Psychological variables related to participation in sports; personality, motivation, and aggression as related to competition in athletic events.
646. **DIRECTED INDEPENDENT STUDY (1-6).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
650. **SEMINAR (1-10).** Pr., graduate standing. Opportunity for advanced graduate students and professors to pursue cooperatively selected concepts and theoretical formulations.
651. **RESEARCH STUDIES (5).** (A) **Health Education** (B) **Physical Education.** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
652. **CURRICULUM AND TEACHING (5).** (A) **Health Education** (B) **Physical Education.** Teaching practices and reappraisal of selecting experiences and content for curriculum improvements.
653. **ORGANIZATION OF PROGRAM (5).** (A) **Health Education** (B) **Physical Education.** Program, organization, and development of basic and supplementary materials for guiding teachers, faculties, and school systems in the continuous improvement of curriculum and teaching practices.
654. **EVALUATION OF PROGRAM (5).** (A) **Health Education** (B) **Physical Education.** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human and material resources and the coordination of areas of specialization.
655. **ADVANCED MOTOR DEVELOPMENT (5).** Developing a theoretical understanding of perceptual motor development and movement education, and in exploring the interdisciplinary implications of movement education for child development and the teaching-learning process.
657. **ADMINISTRATION OF ATHLETICS (5).** Pr., HHP 423 or equivalent. Standards and procedures associated with the administration of school and college athletics. Includes relationships with state and national athletic organizations.
658. **FACILITIES AND EQUIPMENT IN PHYSICAL EDUCATION AND ATHLETICS (5).** Pr., HHP 653 or 657 or COI. Planning and management of budgets, facilities, and equipment for physical education and athletic programs.
662. **PHYSICAL DIMENSIONS OF COUNSELING (4-5).** Pr., CCP 621 or 622. The physical aspects of the helping relationship; implementation of physical fitness skills to raise the energy level of the helper; use of physical fitness and challenge response activities as a tool in the helping relationship. (This course is also offered as CCP 662.)
669. **ADVANCED PHYSIOLOGY OF EXERCISE (5).** Pr., HHP 405 or equivalent. Physiological aspects of fatigue, training, and physical fitness with special emphasis on the integration of organ systems in adapting to requirements of muscular exercise.
680. **SCHOOL-COMMUNITY RECREATION (4-5).** Analysis of recreation as it relates to the school and the community.
691. **PERSPECTIVES ON HEALTH EDUCATION (4-5).** Pr., basic health science course or COI. Developments in school and public health, medicine, and related health sciences in relation to modern health education programs.
692. **CONSUMER HEALTH EDUCATION (4-5).** Pr., basic health science course or COI. Principles related to the selection and use of health products services and health information.
693. **WORLD HEALTH PROBLEMS (4-5).** Pr., basic course in health science, SY 201, EC 200, or COI. Health practices, beliefs, and programs in selected countries and cultures.
694. **TEACHING SEX EDUCATION (5).** Pr., PG 444 or equivalent. Basic concepts, current research, resources, and teaching strategies related to human sexuality and education.
695. **PRACTICUM. (1-15).** Experiences closely relating theory and practice, usually carried on simultaneously.
696. **GRADUATE RESEARCH FORUM (1).** May be repeated but counted only once toward graduation. Presentations by graduate student of proposals and/or findings. Analysis of procedures and findings.
697. **DRUG ABUSE EDUCATION (4-5).** Pr., COI. Practical and working understanding of drugs and related problems to prospective and in-service teachers, counselors, administrators, pharmacists, law enforcement personnel, nurses and others.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
715. **BIOMECHANICS OF SPORT (5).** In-depth investigation of the mechanical and musculoskeletal factors that affect human performance in sport activities; methods of cinematographic, electromyographic and electronic assessment of human motor skills with emphasis on determination of effective and efficient movement patterns.

- 730. **THEORETICAL BASES OF MOTOR LEARNING AND MOTOR CONTROL (4).** LEC. 3, LAB. 2. Pr., HHP 629 or equivalent. Contemporary theories of motor learning and motor control; critical review and analysis of research related to models of motor performance; laboratory experiences that demonstrate current theoretical issues of motor learning and control.
- 746. **DIRECTED INDEPENDENT STUDY (1-6).** Student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
- 750. **SEMINAR IN PHYSICAL EDUCATION (1-10).** Pr., graduate standing. Advanced graduate students and professors pursue cooperatively selected concepts and theoretical formulations.
- 770. **NEUROMUSCULAR ASPECTS OF EXERCISE AND TRAINING (5).** Pr., HHP 669 or COI. Effects of various methods of exercise and training on nerve and muscle cell structure and function. Neuromuscular integration in exercise.
- 795. **PRACTICUM (1-15).** Experiences closely relating theory and practice, usually carried on simultaneously.
- 796. **GRADUATE RESEARCH FORUM (1).** May be repeated but counted only once toward graduation. Presentations by graduate student of proposals and/or findings. Analysis of procedures and findings.
- 798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

History (HY)

Professors Bond, Head, Campbell, Fabel, Flynt, Jones, Lewis,
McDonough, Owsley, and Rea

Associate Professors Beckwith, Bohanen, Cronenberg, Gerber, Hansen, Hall,
Henson, Kicklighter, McFarland, Olliff, Szechi, and Trimble

Assistant Professors Biggs, Crocker, and Melancon

- 101. **WORLD HISTORY (3).** A survey of world civilization from prehistory to 1400.
- 102. **WORLD HISTORY (3).** A survey of world civilization from 1400-1815.
- 103. **WORLD HISTORY (3).** A survey of world history from 1815 to the present.
- 121. **TECHNOLOGY AND CIVILIZATION I (3).** The interaction of technology and of human culture from prehistoric times to the industrial revolution.
- 122. **TECHNOLOGY AND CIVILIZATION II (3).** The interaction of technology and of human culture from the industrial revolution to the end of the nineteenth century.
- 123. **TECHNOLOGY AND CIVILIZATION III (3).** The interaction of technology and other aspects of human culture in the twentieth century.
- 171. **HONORS PROGRAM. ANCIENT AND MEDIEVAL HISTORY (3).** Pr., admission to Honors Program.
- 172. **HONORS PROGRAM. EARLY MODERN HISTORY (3).** Pr., admission to Honors Program.
- 173. **HONORS PROGRAM. MODERN HISTORY (3).** Pr., admission to Honors Program.
- 191. **HONORS TECHNOLOGY AND CIVILIZATION I (3).** Pr., admission to Honors Program. Interaction of technology and human culture from historic times to the industrial revolution for selected honors students from scientific and engineering disciplines.
- 192. **HONORS TECHNOLOGY AND CIVILIZATION II (3).** Pr., admission to Honors Program. Interaction of technology and human culture from industrial revolution to the end of the 19th century for selected honors students from scientific and engineering disciplines.
- 193. **HONORS TECHNOLOGY AND CIVILIZATION III (3).** Pr., admission to Honors Program. Interaction of technology and culture in 20th century for selected honors students from scientific and engineering disciplines.
- 201. **A HISTORY OF THE UNITED STATES TO 1865 (5).**
- 202. **A HISTORY OF THE UNITED STATES SINCE 1865 (5).**
- 207. **EUROPEAN HISTORY, 1500-1815 (5).** A survey of early modern Europe through the French Revolution.
- 208. **EUROPEAN HISTORY SINCE 1815 (5).** A survey of Europe since the French Revolution.
- 300. **CONTEMPORARY CENTRAL AMERICAN HISTORY (3).** Pr., sophomore standing. An analysis of the nature and origins of problems facing contemporary Central America.
- 301. **INTRODUCTION TO FAR EASTERN HISTORY (5).** Pr., sophomore standing. The major cultural and institutional developments of the area.
- 306. **CONTEMPORARY HISTORY (3).** Recent events and their effect on the modern world.
- 307. **HISTORY OF U.S. AIR POWER (3).** Traces evolution of U.S. military aviation policy.
- 308. **NAVAL HISTORY OF THE UNITED STATES (3).** The United States Navy from the American Revolution to the present including the evolution of naval technology and strategy and the role of the navy in defense, discovery, and diplomacy.
- 309. **MILITARY HISTORY OF THE UNITED STATES (3).** History of the United States military policy, strategy, and tactics, 1775 to the present (land warfare).
- 310. **GRECO-ROMAN HISTORY (5).** Pr., sophomore standing. The Classical or Hellenic Civilization from the Homeric Age to the reign of the Emperor Justinian.

311. **MEDIEVAL HISTORY (5).** Pr., sophomore standing. Europe from the fall of the Roman Empire to the Age of Discovery.
315. **AMERICAN BLACK HISTORY (5).** Pr., sophomore standing. Survey of black history in America.
317. **AMERICAN FOLK/ORAL HISTORY (3).** A cultural survey of the "common people," utilizing oral history.
318. **UNITED STATES SOCIAL HISTORY (5).** Pr., sophomore standing. A survey of the history of American society, focusing on such issues as family life, the nature of work, and the impact of immigration.
319. **UNITED STATES INTELLECTUAL HISTORY (5).** Pr., sophomore standing. A survey of the history of American thought.
321. **U.S. LEGAL AND CONSTITUTIONAL HISTORY (3).** Describes changes in U.S. Constitution and legal system.
325. **THE HISTORY OF WOMEN IN THE UNITED STATES (3).** An examination of the forces for change and stability in the lives of American women from colonial times to the present.
337. **GERMAN HISTORY (5).** Survey of German history since the Reformation.
350. **HISTORY OF POLITICAL PARTIES (5).** Pr., sophomore standing. Origin and growth of American political parties from the Federalist era to the present.
354. **HISTORY OF THE MIDDLE EAST (3).** Surveys history and culture of region.
355. **HISTORY OF THE IBERIAN PENINSULA (5).** Spanish and Portuguese history, prehistoric to contemporary.
356. **MODERN FRANCE (5).** From the *Ancien Regime* to the present.
359. **WORLD WAR II (3).** Discusses origins and military campaigns of W.W. II.
379. **SCIENTIFIC REVOLUTIONS (3).** Pr., junior standing. Scientific revolutions since the Renaissance studied in their social and intellectual context.
380. **SCIENCE FICTION AS INTELLECTUAL HISTORY (5).** Pr., junior standing. The interaction between science, technology, and other aspects of human culture as dramatized in classic works of science fiction.
381. **HISTORY OF ALABAMA (5).** Pr., sophomore standing. A brief history of Alabama from the beginning to the present.
390. **SPECIAL TOPICS IN HISTORY (3).** Pr., junior standing. Topics vary. May be taken twice on different topics.
405. **HISTORICAL RESEARCH AND WRITING (5).** An introduction to the methodologies of historical scholarship and to the philosophies of historical interpretation.

ADVANCED UNDERGRADUATE AND GRADUATE

500. **AMERICAN COLONIAL HISTORY (5).** The political, economic, and social history of the colonies from their founding to the end of the French and Indian War, 1763.
501. **THE AMERICAN REVOLUTION AND THE CONFEDERATION, 1763-1789 (5).** The new British Colonial policy, the War for independence, and the first federal constitution and the movement to replace it.
502. **FEDERALIST AND JEFFERSONIAN AMERICA, 1789-1815 (5).** The establishment of the new federal government, the origins of American political parties, and the role of the United States in the French Revolutionary and Napoleonic Wars.
503. **THE AMERICAN SYSTEM AND JACKSONIAN DEMOCRACY, 1815-1850 (5).** Nationalism, sectionalism, egalitarianism, and expansion.
504. **THE CIVIL WAR (5).** The sectional controversy from the Compromise of 1850 to the beginning of hostilities in 1861, and the military, economic, social, and political aspects of the war.
505. **THE RECONSTRUCTION PERIOD (5).** An analysis of the social, economic, and political aspects of the years 1865-1877.
506. **UNITED STATES HISTORY, 1865-1900 (5).** United States history from the end of the Civil War to the beginning of the Progressive era.
507. **UNITED STATES HISTORY, 1900-1945 (5).** United States history from the beginning of the Progressive era to the end of World War II.
508. **UNITED STATES HISTORY, 1945-PRESENT (5).** United States history from the end of World War II to the present.
509. **NINETEENTH-CENTURY U.S. DIPLOMACY (5).** U.S. relations with foreign powers to 1919.
510. **TWENTIETH-CENTURY U.S. DIPLOMACY (5).** Emergence of America as a world power since 1919.
513. **THE SOUTH TO 1865 (5).** The origins and growth of distinctive social, economic, cultural, and ideological patterns in the South with emphasis on period 1815-1860.
514. **THE SOUTH SINCE 1865 (5).** Major trends in the South since the Civil War with emphasis on social, economic, cultural, and ideological development.
516. **SOCIAL AND INTELLECTUAL HISTORY OF MODERN EUROPE (5).** Selected topics in social and intellectual history which have shaped modern European cultures.
526. **THE RENAISSANCE AND REFORMATION, 1400-1600 (5).** Europe during the Renaissance and Reformation.
527. **SEVENTEENTH-CENTURY EUROPE (5).** Emphasis on the Thirty Years' War, Scientific Revolution, overseas colonization, and European political developments in the age of Louis XIV.
528. **EUROPE, 1715-1789 (5).** A history of Europe from the Age of Absolutism to the collapse of the Old Regime.
529. **THE FRENCH REVOLUTION AND NAPOLEONIC EUROPE, 1789-1815 (5).** Causes and course of the Revolution in France, the Consulate, and the Empire, and French hegemony in Europe.

531. **EUROPE, 1815-1890 (5).** European history from the Congress of Vienna to the age of nationalism and imperialism.
532. **EUROPE, 1890-1945 (5).** Europe in the age of world wars, the Great Depression, and totalitarianism.
533. **EUROPE, 1945-PRESENT (5).** The history of Europe since World War II, emphasizing the Cold War and contemporary political, economic, and social conditions.
550. **EASTERN ASIA (5).** A history of China and Japan in the modern world.
552. **CENTRAL AMERICA AND THE CARIBBEAN (5).** An analysis of cultural developments in Central America and the Caribbean areas in the nineteenth and twentieth centuries.
553. **SOUTH AMERICA TO 1800 (5).** The colonial and early national period.
554. **HISTORY OF MEXICO (5).** An analysis of the unique cultural development of Mexico.
555. **SOUTH AMERICA, 1800—PRESENT (5).** A analysis of cultural developments in South America in the nineteenth and twentieth centuries.
556. **HISTORY OF RUSSIA, 800-1861 (5).** Describes the birth and development of Russian culture, society, and politics up to the emancipation of the serfs.
557. **HISTORY OF RUSSIA/USSR SINCE 1861 (5).** Examines Russia/Soviet Union through reform, revolution, and development of a new society to the present day.
571. **HISTORY OF MEDIEVAL ENGLAND (5).** A survey of English origins and institutions to the seventeenth century.
572. **HISTORY OF MODERN ENGLAND (5).** A survey of British history since the seventeenth century.
578. **TECHNOLOGY AND SOCIETY IN PRE-INDUSTRIAL TIMES (5).** The interplay between technology and human culture during selected periods of pre-industrial history.
579. **TECHNOLOGY AND SOCIETY IN THE INDUSTRIAL REVOLUTION (5).** Various approaches to the study of the interaction between technology, industry, and society in the United States and other countries during selected periods, normally in the late eighteenth and nineteenth centuries.
580. **THE HISTORY OF FLIGHT (5).** Stages in the development of human flight, including both aeronautics and space exploration, with interpretative analysis.

GRADUATE

600. **SEMINAR IN AMERICAN HISTORY, 1763-1800 (5).**
601. **SEMINAR IN AMERICAN HISTORY, 1800-1850 (5).**
602. **SEMINAR IN AMERICAN HISTORY, 1850-1876 (5).**
603. **SEMINAR IN AMERICAN HISTORY, 1876-1920 (5).**
604. **SEMINAR IN AMERICAN HISTORY: 1920 TO THE PRESENT (5).**
605. **NINETEENTH CENTURY U.S. DIPLOMACY (5).**
606. **TWENTIETH CENTURY U.S. DIPLOMACY (5).**
608. **AMERICAN SOCIAL AND INTELLECTUAL HISTORY (5).**
609. **SEMINAR IN THE OLD SOUTH (5).**
610. **SEMINAR IN THE NEW SOUTH (5).**
611. **SEMINAR IN BLACK HISTORY (5).**
614. **SEMINAR IN THE HISTORY OF TECHNOLOGY (5).**
615. **SEMINAR IN AEROSPACE HISTORY (5).**
629. **HISTORICAL METHODS (5).**
633. **SEMINAR IN SIXTEENTH-CENTURY EUROPE (5).**
634. **RUSSIAN SOCIETY IN REVOLUTION, 1861-1934 (5).** Pr., HY 556.
635. **SEMINAR IN MODERN EUROPEAN HISTORY (5).**
636. **COLONIAL LATIN AMERICA (5).**
637. **LATIN AMERICA IN THE NATIONAL PERIOD, REVOLUTIONARY MOVEMENTS, AND NATIONAL DEVELOPMENTS (5).**
638. **SEMINAR IN THE FRENCH REVOLUTIONARY AND NAPOLEONIC ERA (5).**
640. **TUDOR ENGLAND (5).** Alternate years.
641. **STUART ENGLAND (5).** Alternate years.
642. **EIGHTEENTH CENTURY ENGLAND (5).**
644. **SEMINAR IN MODERN EUROPEAN DIPLOMACY (5).**
647. **ARCHIVES, MANUSCRIPTS, AND RECORDS ADMINISTRATION I (3).**
648. **ARCHIVES, MANUSCRIPTS, AND RECORDS ADMINISTRATION II (3).**
649. **ARCHIVES, MANUSCRIPTS, AND RECORDS ADMINISTRATION III (3).**

- 650. **ARCHIVAL INTERNSHIP (10).** PHIL HY 628.
- 651. **HISTORIC PRESERVATION INTERNSHIP (10).** On site supervised internship. For students in Historic Preservation program only.
- 699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
- 739. **HISTORIOGRAPHY AND THEORY OF HISTORY (5).**
- 760. **INTRODUCTION TO THE TEACHING OF HISTORY (1).** An introduction to teaching methods and professional training in history. Required of all Ph.D. candidates.
- 799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

READING COURSES

The following reading courses are offered in order to give the graduate student an opportunity for study in specialized areas and are rigorously supervised by the professors responsible for the fields. Registration is by permission of the department and the major professor.

- 720. **DIRECTED READING IN AMERICAN HISTORY TO 1876 (5).**
- 721. **DIRECTED READING IN AMERICAN HISTORY SINCE 1876 (5).**
- 722. **DIRECTED READING IN EUROPEAN HISTORY TO 1815 (5).**
- 723. **DIRECTED READING IN EUROPEAN HISTORY SINCE 1789 (5).**
- 724. **DIRECTED READING IN LATIN AMERICAN HISTORY (5).**
- 725. **DIRECTED READING IN FAR EASTERN HISTORY (5).**
- 726. **DIRECTED READING IN ENGLISH HISTORY (5).**
- 727. **DIRECTED READING IN THE HISTORY OF TECHNOLOGY (5).**

Horticulture (HF)

Professors Shumack, Head, Chambliss, Dozier, Norton,
Ponder, Powell, Sanderson, and Ward
Associate Professors Gilliam, Goff, Keever, and Smith
Assistant Professors J. Brown and Dangler
Adjunct Instructors C. Brown and Sistrunk
Extension Specialist Glover

LANDSCAPE AND ORNAMENTAL HORTICULTURE

- 101. **INTRODUCTION TO HORTICULTURE (3).** LEC. 2, LEC.-DEM. 2. Fall. An introduction to practical and scientific principles of horticulture. Primarily for new students majoring in horticulture and non-majors who want a general knowledge of the subject. General techniques of ornamental, fruit and vegetable gardening, and career opportunities in horticulture will be discussed.
- 201. **ORCHARD MANAGEMENT (5).** LEC. 3, LAB. 4. Fall and Spring. Propagating, planting, pruning, cultivating, fertilizing, spraying, thinning, harvesting, grading, storing, and marketing the most valuable fruits and vegetables grown in the South.
- 202. **FRUIT AND VEGETABLE PRODUCTION (5).** LEC. 3, LAB. 4. Fall. Adaptation of and cultural practices for fruit and vegetable crops for production in Alabama. Degree credit may not be earned in both HF 202 and 201 or 208.
- 221. **LANDSCAPE GARDENING (5).** LEC. 3, DEM. 4. Pr., BI 102. Principles of landscape gardening applied to the development of small home grounds and school grounds. The lecture-demonstration periods are devoted to the study of the identification and use of ornamental plants, landscape drawings, and the propagation and maintenance of ornamental plants.
- 222. **TREES (5).** LEC. 3, LAB. 4. Pr., HF 221 or COI. Identification, culture and use of ornamental trees in landscape plantings.
- 223. **EVERGREEN SHRUBS AND VINES (5).** LEC. 3, LAB. 4. Pr., HF 221 or COI. Identification, culture, and use of broadleaf and narrowleaf evergreens in landscape plantings.
- 224. **PLANT PROPAGATION (5).** LEC. 3, LAB. 4. Pr., BI 102. Basic principles and practices involved in the propagation of horticulture plants.
- 225. **FLOWER ARRANGING (3).** LEC. 2, LAB. 2. General elective. Principles and practices of flower arranging for the home.
- 226. **LANDSCAPE GRAPHICS (3).** LEC. 2, LAB. 3. The development of drawing and drafting skills used to evolve and communicate schematic and detail landscape design concepts.
- 308. **VEGETABLE CROPS (5).** LEC. 3, LAB. 4. Spring, Summer. Principles and special practices in production of vegetable crops.

321. **DECIDUOUS SHRUBS AND VINES (5).** LEC. 3, LAB. 4. Pr., HF 221 or COI. Identification, culture and use of deciduous shrubs and small trees in landscape plantings.
323. **GREENHOUSE ENVIRONMENT CONTROL (5).** LEC. 4, LAB. 3. Pr., BI 102, HF 224. Principles and practices of construction and utilizing greenhouses for various purposes such as plant propagation, crop production, and research.
324. **ELEMENTS AND PRINCIPLES OF LANDSCAPE DESIGN (5).** LEC. 3, LAB. 4. Pr., HF 221 and at least 5 hours from the plant materials courses to be taken previously or concurrently, or COI. The art elements and design principles as they relate to Landscape Design. The organization of outdoor spaces leading to the evolution of Landscape Designs emphasized.
328. **LANDSCAPE CONSTRUCTION (5).** LEC. 2, LAB. 6. Pr., HF 226, 324 or COI. Investigation of the principles and practices used in the detail design and implementation of a landscape site plan or landscape planting plan. Topics to be covered: drafting, surveying, properties of construction materials, earthwork, drainage, and specifications.
330. **HORTICULTURE INTERNSHIP (5).** May be taken more than once for a total of 15 hours. Pr., COI, S-U, graded. To provide the student with practical on the job training under supervision in selected commercial establishments to include wholesale and retail nurseries, greenhouses, garden centers, landscape and landscape maintenance firms, and fruit and vegetable horticultural production units. Each term of employment will be for 1 quarter.
340. **INDUSTRIAL FOOD PRESERVATION TECHNOLOGY (5).** LEC. 3, LAB. 4. Pr., COI or junior standing. Fall, odd years. Principles of food preservation as applied to industry. Processes considered include refrigeration, pasteurization, canning, freezing, drying concentration, fermentation, pickling, salting, irradiation, and the use of food additives.
410. **HERBACEOUS ORNAMENTAL PLANTS (5).** LEC. 3, LAB. 4. Spring. Pr., HF 221 or COI. Identification, culture, and use of herbaceous annuals and perennials, bulbs, herbs, and ornamental grasses. Consideration of flower bed and border preparation, care, and maintenance.
412. **INTERIOR PLANTSCAPING (3).** LEC. 2, LEC-DEM. 2. Fall. Pr., HF 221 or COI. An introduction to the selection, installation, and care of tropical foliage plants in public interior settings. Topics will include: natural and artificial light, plant acclimatization, growing media, fertilizers, containers, and pest control. About 50 plants common in interior plantings will be identified and their uses and limitations discussed.
415. **RETAIL GARDEN CENTER MANAGEMENT (5).** LEC. 4, LAB. 2. Pr., HF 222, 223, and 321 or COI. The following objectives will be covered: financing, selecting a location, designing a center, stocking, selling, personnel management, advertising, and maintaining plants on the lot.
425. **FLOWER SHOP MANAGEMENT (5).** LEC. 4, LAB. 3. Pr., HF 225, 522, MN 241, ACF 211, COI. Winter, odd years. Principles and practices in the establishment and management of a retail flower shop. Store location, financing, buying, floral design, pricing, and merchandise control.
426. **MINOR PROBLEMS (3-5).** May be taken more than once for a total of 15 hours. Pr., COI. Selected problems in either vegetable production, pomology, food technology, or landscape and ornamental horticulture, on which independent library, field, laboratory, or green house investigations are made, under supervision of instructors.
427. **INTERMEDIATE LANDSCAPE DESIGN (5).** LEC. 2, LAB. 6. Pr., HF 324 or COI. Man, nature, art and technology and their influence on Landscape Design.
428. **ADVANCED LANDSCAPE DESIGN (5).** LEC. 2, LAB. 6. Pr., HF 328, 427, and at least 10 hours from the plant materials courses to be taken previously or concurrently, or COI. Continuation of HF 427.
429. **FOOD SCIENCE SEMINAR (1).** Pr., senior standing. Winter. Lectures, discussions and literature reviews by staff, students, and guest lecturers.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **COMMERCIAL VEGETABLE CROPS (5).** LEC. 3, LAB. 4. Pr., HF 308, Fall, even years. Advanced course in production, storing, packaging, and marketing of the major commercial vegetable crops.
504. **FRUIT GROWING (5).** LEC. 3, LAB. 4. Pr., BI 102, HF 201, CH 207. Summer, odd years. Production and marketing of commercial tree fruits grown in the South.
505. **SMALL FRUITS (5).** LEC. 3, LAB. 4. Pr., BI 102. Spring, even years. Principles and practices involved in the production of strawberries, grapes, blueberries, and brambles.
506. **NUT CULTURE (5).** LEC. 3, LAB. 4. Pr., BI 102, CH 207, HF 201. Spring, odd years. Production and marketing of pecans, walnuts, and chestnuts.
521. **CARE AND MAINTENANCE OF ORNAMENTAL PLANTS (5).** LEC. 3, LAB. 4. Pr., BY 306, PLP 309. Winter. Principles and practices of the care and maintenance of trees and shrubs, including pruning, tree surgery, transplanting, and fertilization.
522. **FLORICULTURAL CROP PRODUCTION (5).** LEC. 4, LAB. 3. Pr., AY 304, BY 306, PLP 309, HF 323, ENT 502 or COI. Spring, even years. Floricultural crop production under management in greenhouse and outdoor conditions.
523. **NURSERY MANAGEMENT (5).** LEC. 3, LAB. 4. Pr., HF 224, BY 306, AY 304. Winter. Principles and practices of the management of a commercial ornamental nursery.
531. **ADVANCED LANDSCAPE GARDENING (4).** LEC. 3, LAB. 4. Pr., BI 101, HF 221, graduate standing. Principles and practices applying to the use of ornamental plant material in landscaping.
532. **CONTROLLED PLANT GROWTH (5).** LEC. 3, LAB. 4. Pr., AY 304, BY 306, CH 208, HF 323, junior standing. Controlling and directing growth of plants by manipulation of the environment and by the use of chemicals.
535. **ADVANCED CARE AND MAINTENANCE OF ORNAMENTAL PLANTS (5).** Pr., HF 521. This course will include visits to nurseries, landscape construction firms, and landscape maintenance firms. Visits will also be made to installation and maintenance sites. There will be on site participation in all phases of landscape installation and maintenance including extensive experiences in problem diagnosis.

543. **FOOD CHEMISTRY (5). LEC. 3, LAB. 4.** Pr., CH 207 or 203. Winter. Chemistry of the important components of foods and changes occurring during processing, storage, and handling.
545. **FOOD ANALYSIS AND QUALITY CONTROL (5). LEC. 3, LAB. 4.** Pr., HF 543. Spring, even years. Sensory, chemical, and instrumental food analysis and its application to quality control and evaluation of grades and standards.
593. **PRACTICUM (1-5).** May be repeated not to exceed 10 hours credit. Not open to majors in Horticulture. Provides students with experience in Horticulture closely relating theory and practice, usually carried on simultaneously.

GRADUATE

601. **EXPERIMENTAL METHODS IN HORTICULTURE (5). LEC. 3, LAB. 6.** Summer, even years. Purposes of research, discovery, and progress as related to the scientific methods; research programs, horticultural programs, selecting projects, reviewing literature, preparing project outlines, conducting experiments, recording data, analyzing data, and publication of results.
602. **SEMINAR (1).** May be taken more than once for a maximum of three hours credit. Fall, Winter, Spring.
603. **SPECIAL PROBLEMS IN HORTICULTURE (3-5). (CREDIT TO BE ARRANGED.)** Pr., graduate standing. Any quarter. Selected problems in vegetable production, pomology, food technology, or ornamental horticulture.
604. **PLANT GROWTH AND DEVELOPMENT (5). LEC. 4, LAB. 2.** Pr., CH 207 or BY 306, and COI. Winter, even years. Morphological and physiological changes in horticulture plants as induced by growth regulators and their theoretical implications in the improvement of horticultural crops production.
605. **NUTRITIONAL REQUIREMENTS OF HORTICULTURAL PLANTS (5). LEC. 4, LAB. 2.** Pr., BY 306. Winter, odd years. Nutritional requirements of horticulture crops and factors affecting these requirements.
606. **PHYSIOLOGY OF HORTICULTURAL PRODUCTS FOLLOWING HARVEST (5). LEC. 3, LAB. 4.** Pr., BY 306, graduate standing. Summer, even years. Physiological changes occurring in fresh fruits, vegetables, and other horticultural plant products after harvest. Methods of studying these changes and factors influencing them.
607. **BREEDING OF HORTICULTURAL CROPS (5). LEC. 3, LAB. 4.** Pr., ZY 300, graduate standing. Summer, odd years. An application of genetic principles in the propagation and maintenance of fruit, vegetable, and ornamental crop varieties. The genetic basis of some production problems, and special breeding methods applicable to horticultural crops.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Industrial Design (IND)

Professors Millman, *Acting Head*, and Schaeer
Assistant Professors Lau and Smith
Visiting Lecturer Bartlett

D course grades in the following courses must be repeated: 110, 111, 112, 210, 211, 212, 308, 310, 311, 412, 410, 411, and 412.

110. **DRAWING SYSTEMS (5). LEC. 5.** Pr., acceptance into IND curriculum. Visual exploration, analysis and communication of mechanical design principles.
111. **PERSPECTIVE DRAWING (5). LEC. 5.** Pr., IND 110. Introduction to drawing systems utilized in product design and fabrication.
112. **DRAWING FOR DESIGN AND PROD. (5). LEC. 5.** Pr., IND 111. Advanced product design communication with emphasis on the production processes.
210. **PRIN. OF IND I (5). LEC. 2, LAB. 8.** Pr., sophomore standing, (2.5 overall). Visual communication. Perception theory, design fundamentals; color, figure organization, movement and balance, proportion and rhythm.
211. **PRIN. OF IND II (5). LEC. 2, LAB. 8.** Pr., IND 210 and COI. An extension of principles encountered in Industrial Design 210. A study and analysis of Industrial Design Fundamentals.
212. **PRIN. OF IND III (5). LEC. 2, LAB. 8.** Pr., IND 211 and COI. Structural and functional relationship of design elements; convenience, utility, safety, maintenance.
221. **MATERIALS & TECHNOLOGY (5). LEC. 5.** Pr., sophomore standing. The properties and use of various materials in manufacture and a study of the machine and tool processes used by industry. Survey from the Designer's viewpoint.
223. **INDUSTRIAL DESIGN METHODS (5). LEC. 5.** Pr., sophomore standing. The methods and organizational procedures employed in the analysis and solutions of design problems. Survey of philosophies and theories of design.
307. **ANTHROPOMETRY (5). LEC. 5.** Pr., IND 223, 311. Survey and introduction to the field of body measurements and movements in relation to Design.
308. **DESIGN WORKSHOP (5). LEC. 2, LAB. 8.** Pr., IND 210. Modelmaking and creative modeling. Study Models, Presentation Models, Mock-ups, Prototypes.
310. **INDUSTRIAL DESIGN/CONCEPT DEVELOPMENT (6). LEC. 2, LAB. 12.** Pr., IND 212, 221, 223. Emphasis on concept development using drawing and rendering skills for idea communication and presentation.
311. **INDUSTRIAL DESIGN/PRODUCT DESIGN (6). LEC. 2, LAB. 12.** Pr., IND 221, 223, 310. Product design utilizing principles of design methodology from idea stages through working models.
312. **INDUSTRIAL DESIGN/PACKAGING (6). LEC. 2, LAB. 12.** Pr., IND 311. Packaging, trademark and corporate identity programs. Exhibition and display fixtures.
385. **SEMINAR IN IND (5). LEC. 5.** Pr., junior standing. Study of selected topics in industrial design.

410. **INDUSTRIAL DESIGN/SYSTEMS (6). LEC. 2, LAB. 12.** Pr., IND 312, 307, 308. Design or redesign of products and systems.
411. **INDUSTRIAL DESIGN/ADVANCED PROD. (6). LEC. 2, LAB. 12.** Pr., IND 410. Design or re-design of products and systems of advanced complexity.
412. **INDUSTRIAL DESIGN THESIS (6). LEC. 2, LAB. 12.** Pr., IND 411. A project involving all design phases; project of the student's own selection and approved by the instructor. Presentation of graphics, models and written explanations, and oral presentation before a Design Jury. Thesis material may be retained by the Department for one year.
415. **HISTORY OF INDUSTRIAL DESIGN I (5). LEC. 5.** Pr., IND 212. Design from the first Industrial Revolution to the present, with emphasis on the relation between design and science, art, technology, and the humanities.
420. **PROFESSIONAL PRACTICE (5). LEC. 5.** Pr., 4th year standing. Studies in office organizations, contracts, reports, professional ethics, time planning, product litigation, cost estimating, patent policy and related research areas.

ADVANCED UNDERGRADUATE AND GRADUATE

485. **SEMINAR IN IND (5). LEC. 5.** Pr., 4th year standing. Development of individual projects. Research, design, reports, on approved topics. May be repeated for a maximum of ten hours.
516. **HISTORY OF INDUSTRIAL DESIGN II (5). LEC. 5.** Design from the beginning of artifacts to the first Industrial Revolution, with emphasis on the relationship between design and sciences, art, technology, and the humanities.
586. **CASE STUDIES IN DESIGN (5). LEC. 5.** Design projects undertaken by industry will be studied by examination of artifacts and records, by interviews with professionals responsible for the phases of the projects, and by class discussions of this data and its implication. Focus on the socio-cultural relevancy of the artifacts.

GRADUATE

Individual courses available to graduate students in other fields

- 601-602. **PRINCIPLES OF DESIGN (5-5). LEC. 2, LAB. 9.** The communication principles of form qualities, with emphasis of these principles to the technical and human factors of artifacts, and to the human visual environment.
605. **DESIGN MANAGEMENT (5). LEC. 3, LAB. 6.** The Industrial Design project management and development with emphasis on the interrelational management concepts of research, product planning, production and marketing.
606. **HUMAN FACTORS IN DESIGN (5). LEC. 3, LAB. 6.** A theoretical and empirical examination of human factors (anthropometrics, Biotechnology, Engineering Psychology, Behavioral Cybernetics, Ergonomics) as applied to man-machine environment systems.
- 608-609. **AESTHETICS IN DESIGN (5-5). LEC. 3, LAB. 6.** Aesthetics in the context of the designed environment encompassing such topics as: Non-verbal communication; object language and semiotics; Gestalt and perception systems; information aesthetics and consumer product safety.
610. **DESIGN THEORIES (5). LEC. 3, LAB. 6.** An examination of Design Theories and Philosophies as related to technical artifacts in man-machine systems. Comparative studies of unifying theories in Art, Science, Design, Technology and the Humanities.
- 611-612. **DESIGN METHODOLOGY (5-5). LEC. 3, LAB. 6.** Industrial Design methodologies and scientific methods employed in research, analysis, synthesis and evaluation in comprehensive design problems. Emphasis on creativity and innovation.
- 613-614. **SYSTEMS DESIGN (5-5). LEC. 2, LAB. 9.** Systems approach and interdisciplinary team work to Design problems, inquiries into details of sub-systems, components, and parts, with emphasis on the relation of the performance of technical systems to optimal human factor effects.
- 620-621-622-623. **INDUSTRIAL DESIGN (5-5-5-5). LEC. 1, LAB. 12.** Synthesizing studies in research, analysis and application based on an interdisciplinary concept. The project content is according to the student's interest from one or several of the following design areas: Product Design, Industrialized Housing, Package Design, Corporate Communications, Transportation Design, Exhibition Design and Systems Implementation. Emphasis on the relation of products and systems to those who use them.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Industrial Engineering (IE)

Professors Unger, Head, Black, Cox, Herring, Hool, Maghsoodloo, Park, and Smith
Associate Professors Blakney, Bulfin, Jiang, and White
Assistant Professors Inman, Joo, Mykytka, Nyamekye, and Thomas
Instructors Goff, Leach, and Schaeer

General Curriculum, GC, students (those with undeclared majors) may enroll only with departmental consent.

102. **GRAPHICAL COMMUNICATION & DESIGN (3). LEC. 2, LAB. 3.** Graphical concepts and projective geometry relating to spatial visualization and communication in design, including technical sketching, instrument drawing, and computer-aided drafting and design.
107. **GRAPHICAL ANALYSIS AND DESIGN (2). LAB. 6.** Pr., IE 102. Application of orthographic projection principles in solving engineering problems.

250. **COMPUTER PROGRAMMING (3).** LEC. 2, LAB. 3. Coreq., MH 264. Introductory computer programming using the FORTRAN programming language with emphasis on mathematical and engineering problems. (Not open to students with credit in CSE 204.)
260. **ENGINEERING COMPUTATION (3).** LEC. 2, LAB. 3. Pr., IE 250. An intermediate computer course dealing with the use of MS DOS based microcomputers. Application topics include an in-depth study of MS (or PC) DOS, the how-to of various microcomputer packages used in later IE courses, brief introductions to word processing and spreadsheets, use of files, and a comparison of FORTRAN to MS BASIC.
302. **ADVANCED ENGINEERING GRAPHICS (3).** LEC. 2, LAB. 3. Pr., IE 102, EGR 205. Advanced engineering graphics emphasizing synthesis and creative design using CAD methods (including CAD/CAM fundamentals) and technical sketching for application to specialized fields of engineering.
305. **INFORMATION-DECISION SYSTEMS (3).** LEC. 2, LAB. 3. Pr., IE 260. Interrelated components of complex management information-decision systems. Design considerations for systems involving computers as a principal data processing device.
311. **PROBABILITY FOR ENGINEERS (3).** Coreq., MH 264. Basic probability, random variables and distribution functions.
323. **ENGINEERING STATISTICS I (3).** Pr., IE 311. Coreq., IE 323L. Statistical inference, sampling distributions and their applications. Emphasis is on statistical inference.
- 323L. **ENGINEERING STATISTICS I LABORATORY (1).** LAB. 3. Coreq., IE 323. Laboratory exercises in the application of fundamental concepts in probability and statistical inference.
333. **ENGINEERING STATISTICS II (3).** Pr., IE 323. Coreq., IE 333L. One and two-way analysis of variance. General factorial experiments, confounding in blocks, fractional factorials, regression and correlation. Emphasis is on factorial experiments.
- 333L. **ENGINEERING STATISTICS II LABORATORY (1).** LAB. 3. Coreq., IE 333. Laboratory exercises in the design and analysis of statistical experiments and in regression and correlation analyses.
342. **LINEAR PROGRAMMING (3).** Pr., MH 266, IE 260. Introduction to linear programming with emphasis on model formulation, solution and optimality analysis.
346. **ERGONOMICS I: METHODS ENGINEERING AND WORK MEASUREMENT (4).** Coreq., IE 333, 347. The analysis and design of work methods and work places. Work measurement techniques including stopwatch time study, work sampling, and predetermined motion times.
347. **ERGONOMICS I LABORATORY (1).** LAB. 3. Coreq., IE 346. Experiments and laboratory exercises in methods engineering and work measurement.
352. **DETERMINISTIC OPERATIONS RESEARCH MODELS (3).** Pr., IE 342. Introduction to deterministic operations research with emphasis on model formulation, solution and interpretation of results. Particular models covered include network optimization, integer programming and dynamic programming.
360. **ENGINEERING ECONOMIC ANALYSIS (3).** Pr., MH 264, EC 200 (IE students only), and introductory computer programming. The development of principles required in engineering economy studies and other decision-making oriented courses. Topics include interest and interest formula derivations, economic decision criteria, capital budgeting, depreciation methods, tax considerations, replacement analysis and inflation.
380. **MANUFACTURING ENGINEERING I: MATERIALS AND PROCESSES (4).** LEC. 3, LAB. 3. Pr., MTL 220, EGR 207. Engineering science and design of manufacturing materials, processes, and systems.
390. **SEMINAR IN INDUSTRIAL ENGINEERING (1).** LEC. 1. Pr., junior standing in IE. Discussion of current problems, professional practice, and professional opportunities. (Restricted to Industrial Engineering majors and is to be taken in the third or fourth quarter prior to graduation.)
406. **ERGONOMICS II: OCCUPATIONAL ERGONOMICS FUNDAMENTALS (3).** Pr., IE 347, PG 321; Coreq., IE 407. Ergonomic principles and measurement techniques in the areas of anthropometry, display/control design, work physiology, work environment assessment, and manual materials handling.
407. **ERGONOMICS II LABORATORY (1).** LAB. 3. Coreq., IE 406. Experiments and laboratory exercises in work physiology, heat and noise stress, manual materials handling, and the design of work places, displays, and controls.
408. **PROBLEMS IN MACHINING (5).** LEC. 3, LAB. 4. Pr., IE 380. Advanced phases of metal machining with emphasis on production machines and accessories.
412. **STOCHASTIC OPERATIONS RESEARCH MODELS (3).** Pr., IE 342; Coreq., IE 333. Introduction to stochastic operations research with emphasis on model formulation, solution and interpretation of results. Particular models covered include decision analysis, stochastic processes, queueing theory and its application.
416. **SIMULATION (3).** LEC. 2, LAB. 3. Pr., IE 305, 333. Simulation procedures for solving complex systems analysis problems. Emphasis on random processes, model building, and construction of computer simulation models.
422. **PRODUCTION CONTROL FUNCTIONS I (4).** Pr., IE 346, 360, 380; Coreq., IE 352. Functions of production control; forecasting; production planning; plant location; plant layout; manufacturing processes.
425. **PRODUCTION CONTROL FUNCTIONS II (3).** Pr., IE 422. Functions of production control; inventory analysis; line balancing; scheduling; dispatching and process control.
427. **SENIOR DESIGN PROJECT I (3).** LEC. 2, LAB. 3. Pr., IE 406, 407. Coreq., IE 412, 425, 433. A capstone course in which undergraduate coursework principles are brought to bear upon a design problem in a cooperating industry or institution. (Should be taken the quarter immediately prior to the taking of IE 428.)
428. **SENIOR DESIGN PROJECT II (3).** LAB. 9. Pr., IE 427. Continuation of the design problem begun in IE 427. Completion of the project and written and oral presentation of the results to the cooperating organization. (Should be taken during student's final quarter.)

433. **STATISTICAL QUALITY CONTROL (3).** Pr., IE 323. Control charts for variables and for attributes. Methods for quality improvement. Acceptance sampling by attributes and by variables. Emphasis will be on statistical process control.
460. **INTERMEDIATE ENGINEERING ECONOMIC ANALYSIS (3). LEC. 3.** Pr., IE 360; Coreq., IE 412. Continuation of IE 360. Emphasis on cost estimating techniques and applications of engineering economic principles to various aspects of industrial engineering problems.
479. **HONORS THESIS (1-6).** Pr., department head approval. Individual student endeavor consisting of directed research and writing of honors thesis. (IE Honors Program students only. May be repeated once for a maximum of 6 total credit hours.)
480. **MANUFACTURING ENGINEERING III: TOOL DESIGN (3). LEC. 2, LAB. 3.** Pr., IE 380 or equivalent. The design of workholding devices (jigs and fixtures and hands of robots) and blanking and piercing dies, including the fundamentals of tolerances, locating, and clamping principles.
- 490-491-492. **INDUSTRIAL ENGINEERING PROBLEMS (1-5).** Pr., department head approval. Individual student endeavor under staff supervision involving special problems of an undergraduate nature in Industrial Engineering. Interested student must submit written proposal to department head.
- 493-494-495. **INDUSTRIAL ENGINEERING SPECIAL TOPICS (1-5).** Pr., departmental approval. Special topics courses of an undergraduate nature pertinent to Industrial Engineering. Specific prerequisites will be determined and announced for each offering.

COURSES NOT OPEN TO IE MAJORS

100. **BASIC MANUFACTURING PROCESSES (3).** Introduction to the materials and processes used in manufacturing, with emphasis on modern technology (CAD/CAM, Robotics, etc.) and manufacturing/production systems.
410. **ENGINEERING STATISTICS (5).** Pr., MH 264. Basic probability, random variables, discrete and continuous distributions, sampling distributions, hypothesis testing, estimation, regression and correlation, one-way analysis of variance, testing goodness of fit. (Not open to students with credit in IE 311.)
411. **OPERATIONS RESEARCH (5).** Pr., MH 266, IE 410 or equivalent or concurrently. Model construction, linear programming, network models, dynamic models, stochastic models, queueing theory, decision theory and simulation. (Not open to students with credit in IE 352.)

ADVANCED UNDERGRADUATE AND GRADUATE COURSES

501. **SAFETY ENGINEERING I (3).** Pr., IE 406 or equivalent. Fundamentals of occupational safety engineering with emphasis upon hazard recognition and accident prevention techniques in production environments.
502. **SYSTEMS ANALYSIS FOR SAFETY (3).** Pr., IE 501, 311 or 410, or equivalent. Systems Safety Engineering analysis techniques including Fault-tree, reliability, and cost benefit analysis.
503. **OCCUPATIONAL SAFETY AND ERGONOMICS FOR PRODUCTION ENGINEERS AND MANAGERS (5).** Fundamentals of occupational safety engineering and ergonomics with emphasis on the responsibilities of production engineering and management. (Not open to students with credit in IE 406 or 501).
508. **HUMAN FACTORS ENGINEERING (5).** Pr., PG 211 or 212. Human factors engineering in systems design including applied anthropometry, work place design; assessment of work, noise and heat stress; and equipment design. (Not open to students with credit in IE 406.)
515. **SENSITIVITY ANALYSIS IN OPERATIONS RESEARCH MODELING (3).** Pr., IE 412, 416, and 422 or the equivalent. An investigation of how an operations research model's decisions and returns change with respect to changes in model parameters and characteristics. Several types of models are considered, and examples are presented.
520. **PRINCIPLES OF INTERACTIVE COMPUTER GRAPHICS (3).** Pr., MH 266, IE 260 or equivalent, and junior standing. Computer graphics with emphasis on engineering applications. Typical topics include hardware characteristics of graphics system, mathematical elements and programming techniques for two-dimensional and three-dimensional graphics, user interface design and selected engineering applications.
533. **OFF-LINE QUALITY CONTROL (3).** Pr., IE 333. Taguchi's quality loss function, three stages of quality design and analysis of Taguchi's signal to noise ration.
534. **QUALITY SYSTEMS DESIGN AND IMPLEMENTATION (3).** Pr., IE 533 or COL. On-line and off-line quality engineering methods and their use in integrated total quality control systems.
540. **SAMPLING AND SURVEY TECHNIQUES (3).** Pr., IE 333. Theory and application of statistical sampling and survey methods, with emphasis on methods optimization.
543. **INVENTORY CONTROL (3).** Pr., IE 433, 412, 422. Application of quantitative methods to the control of industrial inventories.
550. **SEARCH METHODS FOR OPTIMIZATION (3).** Pr., MH 264 and senior standing. Single and multivariate search techniques and strategies which are used in finding the optimum of discrete or continuous functions about which full knowledge is not available.
553. **DYNAMIC PROGRAMMING (3).** Pr., IE 352. The theory and methods of dynamic programming will be presented. Specific applications will be discussed.
558. **RELIABILITY ENGINEERING (3).** Pr., IE 333. Reliability, maintenance, and replacement, with emphasis on quantitatively descriptive methods to be used for problem solving.
559. **OPERATIONAL CONTROL SYSTEM DESIGN (3).** Pr., IE 425. The design of operational planning and control systems. Integration of individual systems functions. concept of total systems optimization.

566. **INDUSTRIAL MAINTENANCE ENGINEERING (3).** Pr., IE 305, 422. Industrial maintenance and organization including planning and scheduling, motivation, inspection, preventive maintenance, replacement, data processing and relation to other areas.
575. **PROJECT MANAGEMENT (3).** Pr., IE 411 or 412. Project management and development with primary emphasis on use of operations research methods and cost analysis. Study of the applications of CPM, PERT, and GERT to project management.
584. **MANUFACTURING ENGINEERING IV: ROBOTICS (3).** LEC. 2, LAB. 3. Pr., IE 305, 380. Fundamentals of robotic applications; introduction to the concept of programmed manufacturing systems.
588. **MANUFACTURING ENGINEERING II: GAGES AND MEASUREMENTS (3).** LEC. 2, LAB. 3. Pr., IE 380. The science of measurement as applied to production and inspection of industrial products.
- 590-591-592. **INDUSTRIAL ENGINEERING PROBLEMS (1-5).** Pr., department head approval. Individual student endeavor under staff supervision involving special problems of an advanced undergraduate or graduate nature in Industrial Engineering. Interested student must submit written proposal to department head.
- 593-594-595. **INDUSTRIAL ENGINEERING SPECIAL TOPICS (1-5).** Pr., departmental approval. Special topics courses of an advanced undergraduate or graduate nature pertinent to Industrial Engineering. Specific prerequisites will be determined and announced for each such offering.

GRADUATE

604. **SAFETY ENGINEERING II (3).** Pr., IE 501. Continuation of IE 501 with emphasis on control of hazardous materials, fire prevention, materials handling safety, and safety considerations in production facility design.
605. **FUNDAMENTALS OF INDUSTRIAL HYGIENE (3).** Pr., IE 501 or equivalent. An introduction to the basic concepts and techniques of industrial hygiene with emphasis upon the industrial hygiene/safety engineering interface.
606. **OCCUPATIONAL SAFETY PROGRAM DESIGN AND EVALUATION (3).** Pr., IE 333 or equivalent. The design and evaluation of the occupational safety function in manufacturing environments.
609. **ANALYSIS OF PHYSIOLOGICAL WORK STRESS (3).** Pr., IE 406 or 508. Evaluation of the physiological response of the body to occupational activities with emphasis upon task design and employee selection/placement.
610. **ANALYSIS AND PREVENTION OF ENVIRONMENTAL WORK STRESS (3).** Pr., IE 406 or 508. Evaluation of the response of the worker to the physical work environment. Emphasis is upon design to minimize stress.
611. **OCCUPATIONAL BIOMECHANICS (3).** Pr., IE 406 or 508, ME 321. The use of biomechanics in the evaluation and design of work activities. Emphasis is on manual materials handling, tool design, and repetitive motion trauma.
613. **DESIGN OF NON-STRENUOUS TASKS (3).** Pr., IE 406 or 508. Ergonomics considerations in the design of non-strenuous (typically information processing) tasks. Emphasis is placed upon the minimization of human error and task induced stress.
620. **ADVANCED ENGINEERING ECONOMY (3).** Pr., IE 460. Engineering and economic aspects of project design and analysis. Advanced treatment is given to the following topics: capital budgeting, financing manufacturing organizations, risk and sensitivity analysis, mathematical programming approach to investment decisions, and forecasting methods including input-output analysis.
621. **MARKOV CHAINS (3).** Pr., IE 412. Finite and continuous Markov Chains, Poisson and Wiener processes, applications will be discussed.
624. **INVENTORY AND PRODUCTION CONTROL SYSTEMS (3).** Pr., IE 425. Advanced topics in production control and inventory theory. The relationships between production and inventory will be discussed.
625. **SCHEDULING: THEORY AND APPLICATIONS (3).** Pr., IE 411 or 352. Network based sequencing and scheduling problems. Numerous algorithms are presented for scheduling facilities to achieve one or more of several desirable objectives within precedence and resource constraints. Scheduling areas discussed include projects, assembly lines, flow shops and job shops.
630. **ADVANCED STATISTICAL METHODS FOR ENGINEERS I (3).** Pr., IE 333 or equivalent. Basic concepts of statistical experimental design including randomization methods, analysis of variance methods, mathematical derivation of expected mean squares, multiple comparison tests, and the Bennett and Franklin algorithm.
631. **ADVANCED STATISTICAL METHODS FOR ENGINEERS II (3).** Pr., IE 630. Extension of IE 630, with primary emphasis on analysis of variance methods.
632. **ADVANCED STATISTICAL METHODS FOR ENGINEERS III (3).** Pr., IE 630. Elaboration of basic statistical methods for engineers, with emphasis on a more theoretical study of multiple linear regression and the optimization of multiple linear regression methods.
633. **ADVANCED ON-LINE QUALITY CONTROL (3).** Pr., IE 533. Advanced treatment of statistical methods for process control and acceptance sampling and their role in the modern industrial environment.
640. **NONPARAMETRIC STATISTICS (3).** Pr., IE 333. The theory and application of several nonparametric and distribution-free statistical methods with emphasis on engineering applications.
642. **ADVANCED LINEAR PROGRAMMING (3).** Pr., IE 342. Continuation of 342 with emphasis on theory. Revised simplex, dual simplex, parametric programming, decomposition, and applied problems.
656. **INTERMEDIATE SIMULATION (3).** Pr., IE 416. Intermediate simulation techniques including an indepth study of a simulation language.
660. **MATERIALS HANDLING SYSTEMS (3).** Pr., IE 412, 416. Quantitative analysis and design of material handling systems. Quantitative methods and case studies.

661. **ADVANCED FACILITIES DESIGN (3).** Pr., departmental approval. Quantitative methods used to design production and service facilities are emphasized. Case studies.
664. **MANAGEMENT INFORMATION DECISION SYSTEMS (3).** Pr., departmental approval. Analysis of organizations for information requirements, information flow, data storage and usage and total information systems.
670. **ADVANCED COMPUTATION METHODS (3).** Pr., departmental approval. Advanced computer languages, pattern recognition, and hybrid computation. This course is designed to keep the graduate student abreast of current ideas in this rapidly expanding field.
680. **DISCRETE PROCESS CONTROL AND DYNAMICS (3).** Pr., departmental approval. Sampled-data control systems and computer control topics. Representation of discrete industrial processes.
685. **MANUFACTURING ENGINEERING V: METROLOGY (3).** Pr., IE 380. Design, construction, and use of precision measuring equipment and gages.
- 690-691-692. **INDUSTRIAL ENGINEERING PROBLEMS (1-5).** Pr., department head approval. Individual student endeavor under staff supervision involving special problems of a graduate nature in Industrial Engineering. Interested student must submit written proposal to department head.
- 693-694-695. **INDUSTRIAL ENGINEERING SPECIAL TOPICS (1-5).** Pr., departmental approval. Special topics courses of a graduate nature pertinent to Industrial Engineering. Specific prerequisites will be determined and announced for each offering.
696. **SEMINAR (1).** Pr., IE Graduate Student Standing. Must be taken at least one quarter, but cannot be used in the student's plan of study to apply toward the minimum number of hours for the degree. Presentation and discussion of current I.E. research activities by students, faculty, and guests.
698. **M.J.E. DESIGN PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

COURSES PRIMARILY FOR DOCTORAL STUDENTS

701. **CURRENT TOPICS IN OCCUPATIONAL SAFETY RESEARCH (3).** Pr., IE 502, 604. Topics of current interest in Occupational Safety Research are reviewed. Occupational safety research methodology and research priorities are evaluated.
706. **ADVANCED TOPICS IN ASSESSMENT/DESIGN OF STRENUOUS WORK (3).** Pr., IE 609, 610, and 611. Evaluation of current research activities in the areas of work physiology, biomechanics, and environmental stress.
707. **EVALUATION AND DESIGN OF HUMAN INFORMATION PROCESSING TASKS (3).** Pr., IE 613. Evaluation of current research in the area of human information processing. Emphasis is on human decision behavior modeling.
720. **DECISION AND GAME THEORY (3).** Pr., IE 333 or 410. Classification of decision problems, Bayes risk, utility theory and its applications, optimal strategies for rectangular games, and use of linear programming in solving zero-sum games.
722. **QUEUEING THEORY (3).** Pr., IE 333 or 410, IE 621. Mathematical models of queueing, with applications to problems such as materials flow, inventory policy, and service center design. Simulation solutions to queueing networks are considered.
723. **TIME SERIES (3).** Pr., IE 412. Stationary stochastic processes, time series analysis with emphasis on spectral density functions and applications will be discussed.
725. **ADVANCED SCHEDULING THEORY (3).** Pr., IE 625. A survey of models and methodologies in the areas of sequencing and scheduling are presented. Models covered include: the single processor model, parallel processor model, flow shops and job shops. Methodologies covered include: integer and dynamic programming, branch and bound and other enumeration procedures as well as simulation and sampling and search methods.
734. **NON-LINEAR PROGRAMMING (3).** Pr., IE 642. This course covers quadratic programming, separable programming, gradient methods, and integer programming.
735. **INTEGER PROGRAMMING (3).** Pr., IE 352 and 642. Integer programming and discrete optimization emphasizing applications, formulation, solution techniques and theory.
744. **OPTIMIZATION THEORY FOR LARGE SYSTEMS (3).** Pr., IE 734. Large problems with special structures; decomposition principle, many column problems, relaxation procedures in linear programming, generalized upper bounding, partitioning procedures, and applications.
756. **ADVANCED SIMULATION PROBLEMS (3).** Pr., IE 416. Journal readings of applications simulation and development of procedure to solve large scale, realistic simulation problems.
- 790-791-792. **INDUSTRIAL ENGINEERING PROBLEMS (1-5).** Pr., department head approval. Individual student endeavor under staff supervision involving special problems of an advanced graduate nature in Industrial Engineering. Interested student must submit written proposal to department head.
- 793-794-795. **INDUSTRIAL ENGINEERING SPECIAL TOPICS (1-5).** Pr., departmental approval. Special topics courses of an advanced graduate nature pertinent to Industrial Engineering. Specific prerequisites will be determined and announced for each offering.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Interdepartmental Education (IED)

Included in this section are program areas and course listings designed and taught on the interdepartmental basis.

GRADUATE

- 517. **PROFESSIONAL WRITING IN EDUCATION (2).** Fundamentals of education discourse; strategies and techniques in educational writing; reference sources; the preparation of manuscripts for publication in professional journals.
- 605. **PRACTICUM IN EDUCATIONAL ASSESSMENT AND PRESCRIPTIVE REPORT WRITING (5).**
- 750. **ALTERNATIVE RESIDENCE SEMINAR (2-2-2).** Required of students in an alternative residence plan. These students must complete this three quarter sequence during the fall, winter, and spring quarters. Credit does not count toward minimum requirements for the Doctor of Education degree.

Journalism (JM)

Professors Simms, Head, Brown, Campbell and Logue
Associate Professor Morgan
Assistant Professor Williams
Instructor Johnson

Freshman English is prerequisite for all journalism courses except JM 101.

- 101. **NEWSPAPER STYLE (3).** Required for all journalism majors and minors. The AP-UPI Stylebook and common errors in word selection in newspaper writing.
- 221. **BEGINNING NEWSWRITING (5).** Pr., JM 101; reasonable typewriting skills. Introduction to newswriting, newspaper style, and mechanical practice.
- 222. **NEWSPAPER LAB (1).** Pr., JM or PRJ major, JM 221. (S-U grading only). Student will work a minimum of 20 hours for *The Auburn Plainsman* in reporting, writing, editing or page makeup.
- 304. **INTRODUCTION TO PUBLIC RELATIONS (5).** Pr., JM 101. The various communication skills and technologies for public relations will be explored. Credit for this course precludes credit for SC 304.
- 313. **REPORTING (5).** Pr., JM 221; reasonable typewriting skills. The technical aspects of reporting and newsgathering methods.
- 314. **COPYREADING AND EDITING (3).** Pr., JM 221. Methods of editing copy, writing headlines and proof reading.
- 315. **TECHNICAL JOURNALISM (3).** Not to be used for a major or minor in Journalism. Introduces practices of news coverage and writing.
- 321. **NEWSPAPER MAKEUP AND LAYOUT (5).** Pr., JM 221. Typography and design with practice applications in putting together newspaper pages.
- 322. **FEATURE WRITING (5).** Pr., JM 221 or COI. Gathering material for the writing of "human interest" and feature articles for newspapers and magazines, with consideration given to the marketing of manuscripts.
- 323. **THE COMMUNITY NEWSPAPER (5).** Pr., JM 221 and 321. Methods, problems, and policies involved in editing the community newspaper, as differing from the metropolitan daily.
- 404. **PUBLIC RELATIONS CASE STUDIES AND PROBLEM SOLVING (5).** Pr., JM 304 or SC 304 or COI. Techniques in solving public relations problems. Credit for this course precludes credit for SC 404.
- 421. **PHOTO-JOURNALISM (5).** Uses and processes of photography in the newspaper and magazine field. Operation of press cameras and the technique of developing, printing, and enlarging of pictures is provided.
- 422-423. **JOURNALISM WORKSHOP (3-3).** Pr., JM 313, 314, 321, 322, COI. A two-quarter course giving practical experience in preparation of newspaper, radio, television, and magazine copy through supervised work. The student is expected to work 10 hours per week.
- 425. **JOURNALISM INTERNSHIP (6).** Pr., JM 313, 314, 321, 322, COI. A full-time internship of at least ten weeks with an approved publication, serving as a regular staff member under the direction of the editor.
- 435. **MAGAZINE EDITING AND PRODUCTION (5).** Pr., JM 221. Methods and problems of publishing the popular and trade magazine.
- 465. **HISTORY AND PRINCIPLES OF JOURNALISM (5).** Development of the American Press, principles and ideals of modern journalism, and law of the press and radio.
- 475. **JOURNALISM SPECIAL STUDIES (1-5).** Pr., Departmental approval. Research and analysis of specific journalistic problems. Or lectures and seminars by visiting professional journalists.
- 485. **ADVANCED REPORTING (3).** Pr., JM 313, 314, 321, 322, COI. Developing and writing news stories under deadline pressure; investigative and interpretive reporting.

Laboratory Technology (LT)

Associate Professor Kohl

Adjunct Associate Clinical Professors Adams, Bridger,

Davis, C. B. Elliott, and H. C. Elliott

Adjunct Instructor Reynolds

Adjunct Clinical Instructors Cooper, Crider, Lushington, Marr, and Chappell

- 101. **ORIENTATION (1)**, Fall, Winter. Aims, objectives, and requirements for careers in Medical and Laboratory Technology.
- 301. **HEMATOLOGY (5)**. **LEC. 3, LAB. 6**. Pr., CH 207. Origin, maturation, morphology and function of blood cells; theory of hemostasis; routine hematological laboratory techniques.
- 401. **ADVANCED HEMATOLOGY (5)**. **LEC. 3, LAB. 6**. Pr., LT 301. Advanced study of lymphohematopoietic and hemostatic disorders; laboratory techniques for evaluation and diagnosis of blood disorders.
- 405. **IMMUNOLOGY II (5)**. **LEC. 3, LAB. 6**. Pr., MB 543, junior standing. Immunogenetics, clinical significance of blood group antigens and antibodies, theory and techniques of the serological study of human blood groups.
- 422. **HOSPITAL LABORATORY PRACTICE (5)**. **LAB. 15**. Pr., LT 301. Practice applications of the principles, procedures, and techniques encountered in hospital laboratories.
- 525. **CLINICAL LABORATORY INSTRUMENTATION (5)**. **LEC. 3, LAB. 6**. Pr., CH 519 or 508 or COI. Theoretical and practical application of continuous flow analysis, atomic absorption spectrophotometry, radioimmunoassay and chromatographic techniques used in the analysis of body fluids.

Law Enforcement (LE)

(DEPARTMENT OF POLITICAL SCIENCE)

Assistant Professors Kelly and Pendergast, *CJ Coordinator*

Adjunct Assistant Professor V. N. Abbett

- 260. **SURVEY OF LAW ENFORCEMENT (5)**. Pr., sophomore standing. Introduction to the philosophical and historical backgrounds; agencies and processes; purposes and functions; administration and technical problems; career orientation. (Same course as PO 260.)
- 261. **CRIMINAL EVIDENCE (3)**. Comprehensive analysis of the rules of evidence with particular emphasis on evidence obtained through search, seizure, and arrest.
- 262. **CRIMINAL INVESTIGATION (5)**. Pr., sophomore standing. Criminal investigation procedures, including theory of investigation, case preparation, specific techniques for selected offenses, questioning of suspects and witnesses, and problems in criminal investigation.
- 270. **CAREER EXPLORATION AND PLANNING (2)**. Pr., LE/PO 260 and COI. (S-U grading only.) Career opportunities and demands. Offered all quarters for CJL and CJO. Offered only Fall and Winter quarters for CJY with orientation and participation prior to the quarter.
- 335. **CRIMINAL LAW FOR POLICE OFFICERS (3)**. Pr., PO 209, 210, or LE/PO 260. Statutory criminal law and criminal court procedures as applicable to the law enforcement function. Considers the impact of statutory law and common law on police procedures and policies.
- 361. **SURVEY OF CRIMINALISTICS (5)**. Pr., LE 262, junior standing. Survey of scientific crime detection methods; crime scene search, identification and preservation of evidence; lie detection, *modus operandi*; fingerprint identification, and related subjects.
- 363. **POLICE ADMINISTRATION AND ORGANIZATION (5)**. Pr., junior standing. Principles of organization and administration in law enforcement; functions and activities; planning and research; community relations; personnel and training; inspection and control; policy formulation.
- 412. **COMPARATIVE CRIMINAL JUSTICE SYSTEMS (5)**. Pr., PO 209, PO/LE 260, or PO 312. Institutional comparison and study of social control problems and policies, and functional analysis of the criminal justice systems of selected countries. (Same course as PO 412.)
- 451. **CRIMINAL JUSTICE READING COURSE**. Pr., COI. Readings in criminal justice specialization by agreement of student and instructor.
- 461. **SEMINAR IN POLICE PROBLEMS (5)**. Pr., LE 363 or 464. Review Analysis of major contemporary problems and issues.
- 464. **INTERNSHIP (5-10)**. Pr., LE 270, 10 LE credits, SCR 302 and COI. Internship is with an approved law enforcement, prosecutive, corrections or youth services agency under joint supervision of the agency and the CJ internship adviser. Written reports, conferences and a final seminar on the internship are required.

Management (MN)

Professors Mitra, *Acting Head*, Alexander, Armenakis, Boyles, Feild, Giles, Holley, Mossholder, and Snyder

Associate Professors David, Davis, Gibson, Ledbetter, Niebuhr, Norris, Snow, and Wolters

Assistant Professors Countermine, Ford, L. Gardiner, S. Gardiner, Harris, Hiranyavasi, Kennon, Oswald, Rainer, Sutton, and Swinehart

Adjunct Professor Buford

Effective Fall Quarter 1990, a 2.0 GPA will be required for enrollment in any Business course at the 300-level or above. This rule will apply to both Business and non-Business students.

207. **INTRODUCTION TO COMPUTER PROGRAMMING (3).** Pr., 10 hours math, sophomore standing. Introduction to the use of the computer as a tool in solving business problems, using an appropriate programming language in both a time shared and batch processing environment.
274. **BUSINESS AND ECONOMIC STATISTICS I (5).** Pr., MN 169 or equivalent. Descriptive statistics; probability; probability distributions; normal distribution; introduction to statistical inference making, confidence intervals; hypothesis testing; simple linear regression analysis.
305. **ADVANCED COMPUTER PROGRAMMING (4).** Pr., MN 207. File handling, formatted output, structured programming, string manipulation, applications program/operating systems intercommunication.
307. **BUSINESS COMPUTER APPLICATIONS (4).** Pr., MN 207. Computerizing business applications using a current business language.
310. **PRINCIPLES OF MANAGEMENT (5).** Pr., junior standing. Management functions and the application of management principles in organizations.
342. **HUMAN RESOURCES MANAGEMENT (5).** Pr., MN 310, junior standing. Management of labor, dealing with selection, training, placement, turnover, payment policies, employee representation, etc.
346. **ORGANIZATIONAL BEHAVIOR (4).** Pr., MN 310, junior standing. Analysis and application of theories and techniques for understanding, prediction, and management of human behavior in the organizational context.
374. **BUSINESS AND ECONOMIC STATISTICS II (5).** Pr., MN 274 or equivalent, junior standing. Simple linear regression analysis, inferences and predictions from model; multiple regression analysis; experimental design and analysis of variance; goodness of fit tests; nonparametric tests.
375. **NONPARAMETRIC STATISTICS (3).** Pr., MN 274. The analysis of business and economic data by distribution-free statistical methods.
380. **PRINCIPLES OF OPERATIONS MANAGEMENT (4).** Pr., MN 274, 310, junior standing. Modern scientific management as applied in the actual control and operation of industrial enterprises.
381. **MANAGEMENT DECISION MAKING (5).** Pr., MN 274, 310, junior standing. Various quantitative techniques as aids in managerial decision making under conditions of perfect and imperfect knowledge.
382. **MANAGEMENT INFORMATION SYSTEMS (5).** Pr., MN 274, junior standing. Analysis, design, and implementation of information systems for the management of business organizations; use of various software packages for business applications.
385. **PRODUCTIVITY MANAGEMENT (5).** Pr., MN 380, junior standing. Application of management procedures and techniques to analyze and control production methods and processes.
386. **MATERIALS MANAGEMENT I (5).** Pr., MN 380, junior standing. Application of management procedures and techniques to the acquisition, inventory, utilization, and distribution of materials in manufacturing.
387. **MATERIALS MANAGEMENT II (5).** Pr., MN 386, junior standing. Continuation of MN 386, includes material requirements planning, capacity planning and control, and shop floor control.
400. **STUDENT INTERNSHIP PROGRAM (1-10).** Pr., junior standing and selection by the committee directing the Management Department Intern Program.
401. **ANALYSIS AND DESIGN OF BUSINESS INFORMATION SYSTEMS (5).** Pr., MN 382 or equivalent. General systems techniques, systems analysis and design, database considerations, modern developments, project planning and control, total system integration.
410. **INTERNATIONAL BUSINESS MANAGEMENT (5).** Pr., EC 200, 202, MN 310, MT 331, FI 361, junior standing. Management of multinational firms which own subsidiaries in several countries.
414. **ENTREPRENEURSHIP (5).** Pr., AC 211, 212, FI 361, EC 200, 202, MN 274, 310, MT 255, 331. The elements of entrepreneurship as they relate to the planning and development of new ventures. Emphasis is on the use of decision-making skills in bringing a new business idea to fruition.
415. **SMALL BUSINESS MANAGEMENT (5).** Pr., MN 414. A consulting opportunity which provides a test of the student's ability to apply skills and knowledge to the problems of an existing small business.
420. **INDUSTRIAL PROCUREMENT (5).** Pr., MN 380, junior standing. Role, procedures, responsibilities, and management of materials acquisition function in industry.
421. **MANAGEMENT OF SERVICE OPERATIONS (4).** Pr., MN 380. Analysis of operations management activities in service delivery systems. Emphasis placed on a total systems approach to service management.
440. **ORGANIZATION THEORY (5).** Pr., MN 346, junior standing. Organizations as socio-economic-political systems for collective action imbedded in a largely uncontrollable environment.

443. **LABOR RELATIONS (5).** Pr., junior standing. General survey of the development of collective bargaining, major provisions of labor law, and bargaining issues of craft and industrial unions.
470. **HONORS THESIS (1-6).** Pr., open only to persons in the University Honors Program and with consent of the student's Honors Adviser.
474. **QUALITY ASSURANCE (4).** Pr., MN 274, 380, junior standing. Fundamental concepts in quality assurance; tools and techniques necessary to carry out quality assurance functions; use of control charts and acceptance sampling plans.
475. **MULTICRITERIA DECISION MAKING (3).** Pr., MN 380, 381. Quantitative methods and their application in production and distribution problems of business.
480. **BUSINESS POLICIES AND ADMINISTRATION (5).** Pr., AC 211, 212, FI 361, EC 200, 202, EHA 415, MN 274, 310, 346, 382, MT 255, 331, senior standing. Formulation and application of objectives, strategy, and policies pertaining to a total organization. Emphasis on problem-solving and the relationships between the functional areas of an organization.
484. **OPERATIONS MANAGEMENT POLICIES (5).** Pr., AC 213, FI 361, EHA 415, MN 380, 381, 382, 385, 386, 387, MT 331. Capstone course for OM students. Application of material presented.
490. **SPECIAL PROBLEMS (1-10).** Pr., COI, junior standing. May be repeated. Investigation and research into problems with special interest for the student.
496. **READINGS IN MANAGEMENT (5).** Pr., MN 310, junior standing. Readings from prominent periodicals and journals in management theories, practices, and functions.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **LABOR RELATIONS LAW (5).** Pr., MN 443, junior standing. Analysis of background, content, and significance of industrial relations law.
517. **LABOR RELATIONS IN PUBLIC ORGANIZATIONS (3).** Pr., junior standing. The background, legal and constitutional aspects and management of group negotiations and collective bargaining in public employment. (Same as PO 517.)
546. **PERSONNEL ADMINISTRATION LEGISLATION (5).** Pr., MN 342, junior standing. Legal aspects of personnel administration activities.
547. **EMPLOYEE COMPENSATION (5).** Pr., MN 342, junior standing. Factors, philosophy, design, and problems of administration in compensation programs.
550. **PERSONNEL SELECTION AND PLACEMENT (4).** Pr., MN 274 or PG 315 or equivalent, MN 342, junior standing. Factors involved in developing an effective system for selecting, classifying, and placing personnel.
551. **MANPOWER PLANNING, DEVELOPMENT, AND APPRAISAL (4).** Pr., MN 342, junior standing. Theory and practice plus design of managerial systems in these specialties.
552. **PERSONNEL AND ORGANIZATIONAL RESEARCH (5).** Pr., MN 274 or equivalent, 342, 346, junior standing. Research methods used in human resources management. Analysis of human resource and organizational research problems.
553. **LABOR NEGOTIATION AND ARBITRATION (5).** Pr., MN 443, junior standing. Bargaining issues, preparation for contract negotiation, interest and grievance arbitration of labor-management issues.
554. **INTERNATIONAL LABOR RELATIONS (3).** Pr., MN 443 or MN 410, junior standing. Variations among nations in the structure and government of trade unions, their political and religious ties, and other factors that influence multinational bargaining. Emphasis on industrialized nations.
560. **A SURVEY OF CURRENT TECHNOLOGIES IN MIS (5).** Pr., MN 382 or equivalent. Recent developments in the technologies that impact the effective design, delivery, and use of information systems in organizations.
583. **DATA BASE MANAGEMENT SYSTEMS (5).** Pr., MN 307, junior standing. Business applications software in a data base environment, complex data and file structures, systems design consideration of global and distributed data bases.

GRADUATE

600. **INFORMATION SYSTEMS FOR MANAGERS (5).** Pr., MN 603, 609 or equivalent. In-depth analysis of computing, data processing, and information systems in complex organizations.
601. **RESEARCH METHODS IN MANAGEMENT (5).** Pr., MN 604 or equivalent. Research methodologies commonly used in conducting research in the field of management. Research design and data collection techniques are emphasized.
602. **MANAGEMENT OF BUSINESS DATA COMMUNICATIONS AND NETWORKS (5).** Pr., MN 382 or 600. Provides basic understanding of the principles of data communications and technologies. Provides the technical basis for making business telecommunications decisions.
603. **THE PROCESS OF MANAGEMENT (3).** Pr., for non-business students, consent of Director of the MBA Program, College of Business. Accelerated course in management concepts, production functions and practices.
604. **FOUNDATIONS OF STATISTICS (5).** Pr., MN 274 and for non-business students, consent of the Director of the MBA Program, College of Business. An accelerated course designed to provide beginning MBA students with a foundation in statistical concepts, techniques and applications.
605. **BEHAVIORAL SCIENCE FOR THE CONTEMPORARY MANAGER (5).** Pr., MN 603 or equivalent and, for non-business students, consent of Director of the MBA Program, College of Business. Advanced study of human relations in individual group interactions within the environment of business organizations.

606. **CORPORATE STRATEGY AND POLICY (5).** Pr., AC 610, FI 663, EC 656, MN 605, 681 and MT 631, and, for non-business students, consent of the Director of the MBA Program, College of Business. Basic administrative and managerial problems in business, industry, and other organizations. Management of an organization from a general manager's perspective. Interrelations between environment, organization, strategy, policies, and the execution of plans are emphasized.
608. **ADVANCED HUMAN RESOURCE MANAGEMENT (5).** Pr., MN 342 or COI. Advanced personnel and human resource management.
609. **DATA PROCESSING AND INFORMATION SYSTEMS (3).** Pr., for non-business students, consent of Director of the MBA Program, College of Business. Accelerated course in computer programming, data processing, and information systems.
610. **MULTINATIONAL BUSINESS MANAGEMENT (5).** Pr., completion of prerequisites for graduate study in Business. Management of the multinational enterprise which engages in direct foreign investment.
612. **SIMULATION METHODS IN BUSINESS (4).** Pr., MN 207, 604, or equivalent. The use of simulation techniques in production and operations management systems.
630. **PRODUCTIVITY MANAGEMENT (4).** Pr., MN 603 or equivalent or COI. Work measurement, methods improvement, and work place design in manufacturing.
631. **TOTAL QUALITY MANAGEMENT (4).** Pr., MN 604 or equivalent or COI. In depth study of the systems approach to quality control.
633. **WORK-SYSTEMS DESIGN (4).** Pr., MN 630 or COI. The integration of social, technical, and economic aspects of job design.
637. **PROJECT MANAGEMENT (4).** Pr., MN 603 or equivalent. In depth study of the planning, scheduling, and controlling processes in contemporary industrial projects.
640. **ADVANCED ORGANIZATION THEORY (5).** Pr., MN 603. Traditional and contemporary organization theories with emphasis on current research and controversy.
641. **ADVANCED STUDY IN ORGANIZATIONAL BEHAVIOR (5).** Pr., MN 346 or equivalent, MN 601. Empirical issues pertaining to the theory and process of organizational behavior. Individual and group levels of analysis are emphasized.
643. **ADVANCED PERSONNEL ADMINISTRATION (5).** Pr., MN 603 or equivalent or COI. Provides understanding of equal employment opportunity legislation and associated law. In-depth study of relevant legal cases and current research issues.
644. **COLLECTIVE BARGAINING AND ARBITRATION (5).** Pr., MN 443 or COI. The evolution and development of union-management relationships and the process of collective bargaining and arbitration.
645. **LABOR LAW AND PUBLIC POLICY (5).** Pr., MN 644 or equivalent. Provides comprehensive understanding of current legal and policy issues in labor law. In-depth analysis of precedent setting legal cases.
646. **SPECIAL TOPICS IN LABOR RELATIONS (5).** Pr., MN 644 or equivalent. In-depth analysis of trends of major importance in U.S. labor relations.
647. **PRODUCTION/INVENTORY MANAGEMENT (4).** Pr., MN 603, 604 or equivalent, and 649. Control of manufacturing operations, forecasting, aggregate production and inventory planning, capacity planning and control, and shop floor control.
649. **OPERATIONS MANAGEMENT (4).** Pr., MN 603, 609. Detailed study of techniques related to capital investments, design and implementation of operating systems and management of production and inventory systems.
650. **SEMINAR (1-10).** Pr., COI. For those students engaged in intensive study and analysis of management problems.
666. **INFORMATION SYSTEMS ANALYSIS AND DESIGN (5).** Pr., MN 609 or equivalent. General systems theory, information system documentation, macro and micro information systems analysis, structured methodologies and prototyping.
670. **PRODUCTION/OPERATIONS MANAGEMENT IN MANUFACTURING (4).** Pr., MN 386 and 387 or 647, or COI. Contemporary issues such as computer aided manufacturing systems, just-in-time, and the role of group technology.
672. **MANAGERIAL DECISION MAKING AND PROBLEM SOLVING (4).** Pr., MN 631, 670. A case course involving complex problem analysis and decision selection within the production/operations management area.
674. **COMPENSATION THEORY (5).** Pr., MN 547 or equivalent, MN 601. In-depth study of compensation theories, design technology, and research methodologies used in developing and analyzing compensation systems.
676. **OPERATIONS MANAGEMENT IN SERVICE SYSTEMS (4).** Pr., MN 630, 631, 647, 681. The application of production and operations management techniques to problem solving in the service sector.
680. **APPRAISAL AND DEVELOPMENT OF HUMAN RESOURCES (5).** Pr., MN 551 or equivalent, MN 601, PG 627 or equivalent. Provides knowledge of empirical issues pertaining to the appraisal, development, and internal staffing in organizations.
681. **MANAGEMENT SCIENCE (5).** Pr., MN 609 or equivalent, and, for non-business students, consent of the Director of the MBA Program, College of Business. Deterministic and stochastic quantitative methods for business applications.
683. **ADVANCED DATA BASE MANAGEMENT SYSTEMS (5).** Pr., MN 583 or equivalent. Advanced concepts and techniques of data base management systems.
685. **ADVANCED HUMAN RESOURCE SELECTION (5).** Pr., MN 550, PG 515, PG 628 or equivalents. Provides understanding of legal and technical considerations in developing and administering personnel selection programs.

- 687. **EXPERT SYSTEMS FOR BUSINESS** (5). Pr., MN 583 or equivalent. In depth study of the inference capability of information processing technologies in expert systems. Concepts of artificial intelligence will be reviewed and other topics will include decision support systems, database management systems, and telecommunications design and management.
- 688. **ADVANCED MANAGEMENT INFORMATION SYSTEMS AND DECISION SUPPORT SYSTEMS** (5). Pr., MN 560, 583, 666, and 689. Problems of advanced analysis and design and implementation of MIS, DSS and knowledge-based systems in organizations.
- 689. **INFORMATION RESOURCE MANAGEMENT** (5). Pr., MN 307, MN 609 or equivalent. Management of information systems resources, unique management problems in a computer information systems environment.
- 690. **SPECIAL PROBLEMS** (1-5). Pr., completion of 10 hours of 600-level management courses, and COI. Variable content in the management area.
- 696. **READINGS IN MANAGEMENT** (5). Pr., MN 603. General management theories, practices, and functions in industry and business. Also, covers the role of personnel management and human relations.
- 699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** Pr., COI.
- 799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** Pr., COI.

Marketing and Transportation (MT)

Professors Baker and Lambert

Associate Professors Adams, Guffey, Head, Harris, and Rotfeld

Assistant Professors Abernethy, Laumer, Natarajan, and Smith

Visiting Assistant Professor Goff

Effective Fall Quarter 1990, a 2.0 GPA will be required for enrollment in any Business course at the 300-level and above. This rule will apply to both Business and non-Business students.

LEGAL ENVIRONMENT

- 241. **BUSINESS LAW I** (5). Pr., sophomore standing. Introduction to contracts, sales, torts, and insurance; ethics and social influences; and agency.
- 242. **BUSINESS LAW II** (5). Pr., sophomore standing. Legal principles concerning secured transactions, bankruptcy, suretyship, trusts and estates, partnership law, real and personal property, corporations, federal securities, regulations, accountant's legal liability, negotiable instruments, and ethics and social influences.
- 255. **LEGAL AND SOCIAL ENVIRONMENT OF BUSINESS** (4). Legal and social environment for business operation with emphasis on contemporary issues.
- 344. **ENVIRONMENTAL LAW** (4). Pr., junior standing. Federal, State, and local law on conservation and regulation of environmental matters.

GRADUATE

- 605. **SOCIAL AND LEGAL ENVIRONMENT OF BUSINESS** (5). Pr., EC 601, and, for non-business students, consent of Director of the MBA Program. College of Business. The influence of the social, legal, political and economic environment on business.

MARKETING

- 331. **PRINCIPLES OF MARKETING** (5). Pr., EC 202 or AEC 202 or EC 301 and junior standing. A general survey of the field of marketing covering marketing channels, functions, methods and institutions.
- 332. **MARKETING COMMUNICATION MANAGEMENT** (5). Pr., MT 331, junior standing, not open to marketing majors. Credit cannot be received for both MT 332 and MT 432. An examination of the principles and applications of promotion in marketing.
- 333. **MERCHANDISING MANAGEMENT** (5). Pr., MT 331, junior standing, not open to marketing majors. Credit cannot be received for both MT 333 and MT 433. An examination and application of retail merchandising management concepts, principles, and fundamentals.
- 336. **QUANTITATIVE ANALYSIS IN MARKETING** (5). Pr., MN 207, 274, MT 331, MH 161, 169, and junior standing. An examination of the role of quantitative methods in implementing marketing strategy.
- 337. **FUNDAMENTALS OF SALESMANSHIP** (5). Pr., MT 331, and junior standing. Knowledge of buyer behavior and skill requirements necessary for successful selling; the sales process; business and social responsibilities of salespersons.
- 341. **BUYER BEHAVIOR** (5). Pr., MT 331, PG 211, and junior standing. Analysis of the buying process as it is affected by environmental and institutional forces and development of market strategies which recognize these factors.
- 400. **STUDENT INTERNSHIP PROGRAM (1-10)**. Pr., junior standing and selection by the committee directing the Marketing and Transportation Intern Program. Credit hours are not applicable as departmental electives. Summer only. (May be repeated for a maximum of 10 hours credit).
- 432. **PROMOTIONAL STRATEGY** (5). Pr., MT 331, 336, 341, and junior standing. Problems of persuasive marketing strategy, promotional objectives, methods of implementing these objectives, and the approaches by which the methods might be blended.
- 433. **RETAIL STORE MANAGEMENT** (5). Pr., MT 331, 336, 341, and junior standing. Principles and practices in the scientific operation of the retail store. Store location, layout, buying, pricing, and merchandise control.

434. **PURCHASING (5).** Pr., MT 331. Objectives, control, and the direction of industrial purchasing.
436. **MARKETING RESEARCH METHODOLOGY (5).** Pr., MT 331, 336, 341, and junior standing. Methods of scientific research in the field of marketing and their application to the solution of marketing problems.
437. **SALES MANAGEMENT (5).** Pr., MT 331, 336, 341, and junior standing. Principles and practices of sound organization and administration of sales organization. Includes consideration of: sales department organization, selecting, training, compensating, and supervising sales planning; setting up sales territories and quotas.
438. **MARKETING CHANNEL SYSTEMS (5).** Pr., MT 331, 341 and junior standing. The nature and role of marketing channels. Major marketing strategy problems such as designing channel objectives and constraints, distinguishing major channel alternatives, and motivating, evaluating, and controlling channel members.
440. **INTERNATIONAL MARKETING (5).** Pr., MT 331, 341, completion of freshman math requirement, and junior standing. Adapting the marketing process of the domestic firm to international operations and the institutional structure that exists to service foreign markets and the practice of marketing administration by firms operating within these markets.
470. **HONORS THESIS (1-6).** Pr., open only to persons in the University Honors Program and with consent of the student's Honors Adviser.
477. **BUSINESS LOGISTICS (5).** Pr., MT 336 and junior standing. Problems and analysis in the design and management of logistics systems.
490. **SPECIAL PROBLEMS IN MARKETING (1-10).** Pr., MT 331 and senior standing. Qualified students conduct investigations of special problems in Marketing. (May be repeated for a maximum of 10 hours credit.)
498. **MARKETING STRATEGY (5).** Pr., MT 331, 336, 341, 436 and completion of all departmental electives. An integrative capstone course for marketing majors with special emphasis on strategic planning.

ADVANCED UNDERGRADUATE

581. **SPECIAL STUDIES IN MARKETING RESEARCH (5).** Pr., MT 336, 341, 436. Specialized indepth study and research projects within a particular subject area.
582. **SPECIAL STUDIES IN RETAILING/MERCHANDISING (5).** Pr., MT 336, 341, 433, 436. Specialized indepth study and research projects within a particular subject area.
583. **SPECIAL STUDIES IN PROMOTION (5).** Pr., MT 336, 341, 432, 436. Specialized indepth study and research projects within a particular subject area.
584. **SPECIAL STUDIES IN PRODUCT MANAGEMENT (5).** Pr., MT 436. Specialized indepth study and research projects in product management.

GRADUATE

630. **SURVEY OF MARKETING MANAGEMENT (3).** Pr., EC 601 and, for non-business students, consent of Director of the MBA Program, College of Business. An accelerated course in marketing concepts and practices.
631. **MARKETING MANAGEMENT (5).** Pr., all foundation courses, and for non-business students, consent of Director of the MBA Program, College of Business. Indepth analysis of concepts and techniques pertinent to executive decision-making in marketing.
632. **MARKETING COMMUNICATIONS (5).** Pr., MT 631. A managerial perspective of the marketing communications process.
636. **MARKETING RESEARCH: METHODOLOGY AND APPLICATIONS (5).** Pr., MN 604, MT 631. An examination of accepted marketing research techniques with emphasis on research design, implementation, and data analysis from the point of view of marketing management.
641. **BUYER BEHAVIOR (5).** Pr., MT 631. Analysis of the major psychological, sociological, and organizational behavior concepts involved in consumer and industrial buyer behavior.
690. **SPECIAL PROBLEMS (1-5).** Variable content in marketing.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**

TRANSPORTATION AND PHYSICAL DISTRIBUTION

372. **PRINCIPLES OF TRANSPORTATION (5).** Pr., EC 200 and junior standing. The development of systems of transportation. Analysis of rates and their effects upon commerce and industry. Government regulation of transportation agencies.
373. **INTRODUCTION TO PHYSICAL DISTRIBUTION (5).** Pr., MT 331 and junior standing. Fundamentals of physical distribution activities and their interrelationships in the management of the distribution process.
400. **STUDENT INTERNSHIP PROGRAM (1-10).** Pr., junior standing and selection by the committee directing the Marketing and Transportation Intern Program. Credit hours are not applicable as departmental electives. Summer only. (May be repeated for a maximum of 10 hours credit.)
470. **HONORS THESIS (1-6).** Pr., open only to persons in the University Honors Program and with consent of the student's Honors Adviser.
474. **INDUSTRIAL TRAFFIC MANAGEMENT (5).** Pr., MT 372. Problems and policies involved in the traffic management function of the industrial firm.
475. **TRANSPORTATION REGULATION AND PUBLIC POLICY (5).** Pr., MT 372 or COI and junior standing. Economic, legislative, and administrative problems related to regulation of transportation and utility rates and services.

476. **CARRIER MANAGEMENT POLICY AND PRACTICE (5)**, Pr., MT 372, 475, or COI and junior standing. Problems and policies in the management and administration of transport enterprises of different modal types, primarily air, rail, and motor.
477. **BUSINESS LOGISTICS (5)**, Pr., MT 336 and junior standing. Problems and analysis in the design and management of logistics systems.
484. **SPECIAL STUDIES IN TRANSPORTATION/LOGISTICS (5)**, Pr., MT 372, and two from 373, 475, 476, and 477. Specialized in-depth study and research projects within a particular subject area.
490. **SPECIAL PROBLEMS IN TRANSPORTATION (1-10)**, Pr., MT 372 and senior standing. Qualified students conduct investigations of special problems in Transportation. (May be repeated for a maximum of 10 hours credit.)

GRADUATE

671. **LOGISTICS MANAGEMENT (5)**, Pr., EC 601, MN 604 or their equivalents. Analysis of major logistics elements within the total system of the firm. A problem-oriented approach is employed in developing a managerial perspective.
672. **TRANSPORT ECONOMICS AND PUBLIC POLICY (5)**, Pr., EC 601 or equivalent. An examination of the U.S. transport system and an analysis of public policy issues regarding regulatory objectives and efficiency of resource use in transportation.
690. **SPECIAL PROBLEMS (1-5)**. Variable content in transportation.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**

Materials Engineering (MTL)

Professors Budenstein, Beckett, Chin, *Chairman*, Jemian, and Wilcox
Associate Professors Jang and Madsen
Assistant Professors Kowbel and Zee

Responsibility for this curriculum rests with the interdisciplinary Materials Engineering Curriculum Committee. Questions should be directed to the Department of Mechanical Engineering, which administers the program. General Curriculum, GC, students (those with undeclared majors) may enroll only with departmental consent.

210. **STRUCTURE OF MATERIALS (3)**, Pr., CH 103, PS 220 or 205. Theories and structures of crystalline and amorphous materials. Bonding, crystal classes, defects, and atomic movement. (Mainly for Materials majors.)
220. **MATERIALS AND PROPERTIES I (3)**, Pr., CH 103, PS 220. Methods of mechanical testing, effects of environment, deformation and annealing, failure, and non-destructive testing as related to the properties of materials.
320. **MATERIALS AND PROPERTIES II (4)**. LEC. 3, LAB. 3. Pr., MTL 220. Relationship between structure and properties of materials; solidification; mechanisms of alloy strengthening; phase transformations; heat treatments; and material systems.
336. **PHYSICAL ANALYSIS OF MATERIALS I (4)**. LEC. 3, LAB. 3. Pr., MTL 320. The analysis and interpretation of the structures of materials using optical techniques. Specific physical properties will be measured. Samples will be prepared and processed by the students.
337. **PHYSICAL ANALYSIS OF MATERIALS II (4)**. LEC. 3, LAB. 3. Pr., MTL 220. The analysis and interpretation of the structures and properties of materials using special techniques. Diffraction, radiography and various non-destructive test procedures will be employed.
338. **PHASE DIAGRAMS (4)**. Coreq., MTL 320. Methods of representing and interpreting phase equilibria. Binary and multicomponent systems. Simpler temperature-composition systems and more complex temperature-pressure-composition systems. Major emphasis on applications. Minor emphasis on phase diagram determination and thermodynamics.
435. **PHYSICAL ANALYSIS OF MATERIALS III (4)**. LEC. 3, LAB. 3. Pr., MTL 320. The evaluation of microscopic structural features, anisotropic materials properties and the detection and interpretation of flaws. Microscopy, radiography and other non-destructive test methods will be employed.
436. **ENGINEERING MATERIALS SCIENCE — FERROUS METALLURGY (3)**, Pr., MTL 336. Design of ferrous metals following modern theory and practice. Hardenability, alloying deformation, and special purpose steels.
445. **TRANSFORMATIONS IN CONDENSED PHASES (4)**. LEC. 3, LAB. 3. Pr., MTL 320, MTL 550, and MTL 436. Important transformations in both metallic and non-metallic materials with crystalline or glass structures. Structures, mechanisms, distinctive characteristics and applications will be studied. Selected transformations will be studied in the laboratory.
446. **THEORETICAL MATERIALS ENGINEERING (3)**, Pr., MTL 575. Coreq. MTL 570, 513. The physical properties of materials in relation to modern theories.
447. **MECHANICS OF ENGINEERING MATERIALS (4)**. LEC. 3, LAB. 3. Pr., MTL 337. The mechanical properties in relation to structural features of alloys, plastics, ceramic materials and composites under static, dynamic and cyclic service and test conditions. Conditions for the attainment of optimum properties and behavior will be emphasized.
448. **INTRODUCTION TO CERAMICS (3)**, Pr., MTL 210, 320. The engineering applications and design principles of important ceramic materials will be studied with particular attention directed to the structure-property relationships. Both glassy and crystalline ceramic materials will be included.
479. **HONORS THESIS (1-6)**, Pr., COI and department head approval. Individual student directed research and writing of honors thesis. (MTL Honors Program students only. May be repeated once for a maximum of 6 total credit hours.)

ADVANCED UNDERGRADUATE AND GRADUATE

513. **INTRODUCTION TO X-RAY CRYSTALLOGRAPHY (5).** LEC. 4, LAB. 3. Pr., COI or MTL 337. Principles of crystallography, the reciprocal lattice, theory of x-ray diffraction, and the powder, Laue, and diffractometer methods. (Same course as PS 513.)
515. **POLYMER TECHNOLOGY I (4).** LEC. 3, LAB. 3. Pr., MTL 320. Important aspects of polymer science, connection between chemical structure and important properties of modern plastics and synthetic structural materials; the common methods of fabrication of these into articles and the basic chemistry behind their manufacture.
516. **POLYMER TECHNOLOGY II (3).** LEC. 3. Pr., MTL 515 or TE 424. Continuation of MTL 515. Study of polymerization and condensation polymers. Modes of fabrication, special use selection requirements, and study of a number of commercially available materials and their areas of use.
537. **MANUFACTURING PROCESSES AND MATERIALS (3).** Pr., junior standing. MTL 320 and departmental approval. Principles and engineering problems involved in the fabrication of materials.
550. **THERMODYNAMICS OF MATERIALS SYSTEMS (4).** Pr., ME 301, CH 507, and MTL 338. The laws of thermodynamics applied to the stability of materials phases, crystal imperfections, solubility, oxidation, surface and interfacial energy, and transformations.
570. **ELECTRICAL PROPERTIES OF MATERIALS (3).** Pr., EE 302. Studies of the electrical properties of materials with emphasis on semiconductors.
575. **RATE PROCESSES IN MATERIALS (3).** Pr., MTL 550, or COI and junior standing. Diffusion in the gas, liquid and solid phases and the fundamentals of chemical reaction kinetics pertinent to the crystallization and transformation of materials.
610. **ADVANCED MATERIALS THERMODYNAMICS (3).** Pr., MTL 550 or equivalent. Application of the laws of thermodynamics to material system: chemical reactions, phase equilibria and transformations, oxidation, theoretical phase diagram generation and nonideal solution theory.
615. **KINETICS OF MATERIALS (3).** Pr., MTL 575 or equivalent. Activated rate theory, solid state diffusion, atomic theory of diffusion, Kirkendall effect, Darken equations, high diffusivity phenomenon, and chemical reaction kinetics pertinent to transformations.
630. **ELECTRON MICROSCOPY I — SEM AND EDS (4).** Pr., graduate standing. Theory and techniques of instrumentation and practices of scanning electron microscopy and X-ray microscopy and X-ray microanalysis as used by the material scientist.
632. **ELECTRON MICROSCOPY II — TEM (4).** Pr., graduate standing. Theory and techniques of instrumentation and practical applications of transmission electron microscopy.
636. **QUANTITATIVE MICROSTRUCTURAL ANALYSIS (3).** Principles of the measurement of features in materials microstructure based on planar sections. Specific applications of the measurement of average dimensions and proportions of areas and volumes. The statistical basis is emphasized.
660. **STRUCTURE AND PROPERTIES OF SOLIDS (3).** Pr., departmental approval. Denominations of structure are considered, via an interdisciplinary approach, from the viewpoint of providing a fundamental insight with respect to the genesis of selected macroscopic properties.
661. **CORROSION: FUNDAMENTALS AND APPLICATIONS (3).** Pr., departmental approval. Nature and mechanisms of corrosion. Effects of material manufacturing methods, construction and environment. Corrosion types and methods of corrosion control.
662. **PERFORMANCE OF METALS AT ELEVATED TEMPERATURES (3).** Pr., departmental approval. Fundamental behavior of metals at elevated temperatures. Commercial and experimental types of ferrous and nonferrous alloys and their suitability for elevated temperature applications.
663. **SOLIDIFICATION PROCESSING (3).** Theoretical presentation of the principles that apply to crystal growth, ingot casting and welding. The basis for the control of nucleation, growth, microstructure and morphology is studied. Special consideration is given to the effects of heat flow, fluid flow, and composition.
665. **STRENGTHENING OF METALS (3).** Pr., MTL 320 or equivalent. A treatment of the six basic mechanisms by which metals are strengthened. Emphasis is placed on causative factors and accompanying manifestations.
666. **PLASTICITY OF METALS (3).** Pr., MTL 320 or equivalent. A quantitative treatment of the minimization of plastic flow, by means of design considerations, where the phenomenon is associated with deleterious effects; the maximization of plastic flow, by means of material conditions and forming method considerations, where the objective is to form or shape.
667. **DISLOCATION THEORY (3).** Pr., departmental approval. Nature and properties of dislocations including crystal structure and imperfections, dislocation geometry in both ideal and real crystals, dislocation configurations, multiplication and interactions with various imperfections, and methods of observation.
669. **ADVANCED POLYMER SCIENCE AND TECHNOLOGY (4).** Pr., departmental approval. A course designed to discuss the state-of-the-art of polymer science and engineering emphasizing the elucidation of polymer structure, developments of new materials and of new fabrication methods, and recent studies on structure-property processing interrelationships.
670. **STRUCTURE AND PROPERTIES OF COMPOSITE MATERIALS (4).** Pr., departmental approval. To familiarize graduate students with the sciences, engineering, and design of composite materials, emphasizing the resin development, fiber technology, fiber-matrix interface, principles of reinforcement, fabrication technology, and application of polymer-based composites.

671. **WELDING METALLURGY (3).** Pr., departmental approval. Classification of welding processes and study of weldability with an emphasis on material characteristics. Welding of aluminum base alloys, stainless steels and alloy steels is studied in relation to phase diagrams, thermal distribution, welding variables, residual stress, defects, testing and structure-property relations.
672. **MATERIALS FAILURE ANALYSIS (4).** Pr., departmental approval. Description of techniques and methodology used in describing and identifying sources of failures in engineering systems, fractography.
673. **INTRODUCTION TO THIN FILM TECHNOLOGY (3).** Pr., departmental approval. Deposition processes; physics of thin films; thin film characterization; application of thin films; electrical, magnetic, optical, and structural properties of thin films.
685. **SEMINAR IN MATERIALS ENGINEERING (1).** Required during each quarter of residency but cannot be used toward minimum requirements for graduate degree in Materials Engineering. The content will change for each quarter and will consist of off-campus speakers and presentations by graduate students and faculty.
691. **DIRECTED READING IN MATERIALS ENGINEERING (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
750. **RADIATION EFFECTS IN MATERIALS (3).** Pr., graduate standing. Theoretical treatments of radiation effects and damage in materials, especially related to the nuclear industry.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Mathematics (MH)

Associate Professor C.E. Robinson, *Coordinator*

For other staff and upper level mathematics courses, see sections for Mathematics — Algebra, Combinatorics and Analysis (MHC) and Mathematics — Foundations, Analysis, and Topology (MHT).

100. **MATHEMATICAL INSIGHTS (5).** For students in the arts or humanities. The purpose of this course is to give such students insight into the nature of mathematics by engaging them in mathematical thought processes within a suitable elementary framework. Prior credit for any other University mathematics course precludes credit for this course.
140. **COLLEGE ALGEBRA (5).** Pr., high school geometry, second year high school algebra or departmental approval.** Algebraic techniques, coordinate geometry, functions and relations and their graphs, and common logarithms. A preparatory course for MH 151, MH 160 and MH 161. However, credit is not allowed for both MH 140 and MH 160.
151. **FINITE MATHEMATICS (5).** Pr., MH 140 or 160. Selections from elementary combinatorial analysis, probability theory, linear algebra, linear programming. Not open, except by special permission of the Department of Mathematics, to students in Engineering or the Mathematics or Physics majors. Credit is not allowed for both MH 151 and MH 169.
155. **ANALYTIC GEOMETRY (5).** Pr., MH 160 or equivalent. Plane and solid analytic geometry. Lines, planes, circles, spheres, vectors, conics, change of coordinates, polar coordinates, parametric equations, curve sketching.
160. **PRE-CALCULUS WITH TRIGONOMETRY (5).** Pr., high school geometry, second year high school algebra or departmental approval.** The basic analytic and geometric properties of the algebraic and trigonometric functions with heavy emphasis on the latter. A preparatory course for the calculus sequence. Students who need a review of algebraic techniques should take MH 140. However, credit is not allowed for both MH 140 and MH 160.

**This is a non-credit course for students in some scientific and technical curricula.

161. **ANALYTIC GEOMETRY AND CALCULUS (5).** Pr., MH 140 or 160. Limits, the derivative, applications of the derivative, antiderivatives; the definite integral; the fundamental theorem of calculus.
162. **ANALYTIC GEOMETRY AND CALCULUS (5).** Pr., MH 160 and 161. Integrals, applications of the integral, the calculus of the exponential and logarithmic functions. The calculus of the trigonometric and inverse trigonometric functions, the conic sections.
163. **ANALYTIC GEOMETRY AND CALCULUS (5).** Pr., MH 162. Techniques of integration, indeterminate forms, improper integrals, solid analytic geometry, multiple integrals.
169. **BUSINESS MATHEMATICS WITH CALCULUS APPLICATIONS (5).** Pr., MH 161. Selections from calculus, elementary combinatorial analysis, probability theory, linear algebra, linear programming with emphasis on business applications. Designed for students in the School of Business and not open, except by special permission of the Department of Mathematics, to students in Engineering or the Mathematics or Physics majors. Credit is not allowed for both MH 151 and MH 169.
- 191-192-193. **CALCULUS FOR ENGINEERING AND SCIENCE (5-5-5).** Pr., MH 160. Plane and solid analytic geometry, real and vector valued functions, limits, derivatives and antiderivatives of algebraic and trigonometric functions. Integrals, the Fundamental Theorem of Calculus, line integrals, potential functions, force fields, and surface integrals. Methods of integration, indeterminate forms, improper integrals.
264. **ANALYTIC GEOMETRY AND CALCULUS (5).** Pr., MH 163. Infinite series, partial derivatives, vector calculus.

265. **LINEAR DIFFERENTIAL EQUATIONS (3).** Coreq., MH 264. First and second-order linear differential equations including the solution of such equations by infinite series.
266. **TOPICS IN LINEAR ALGEBRA (3).** Pr., MH 163. Linear spaces, vector spaces, linear transformations, matrices and determinants. Not open to students who have credit for MH 337, 531 or MH 505 or MH 537.
267. **DISCRETE PROBABILITY (5).** Coreq., MH 161. Designed for students whose fields require a basic knowledge of probability and for those who plan to take upper level courses in probability and statistics. Conditional probability, independence and random variables with emphasis on discrete random variables.
269. **ELEMENTARY DIFFERENTIAL EQUATIONS (5).** Pr., MH 264. Ordinary differential equations with applications. Credit for this course precludes credit for MH 265.
271. **INTRODUCTION TO MATHEMATICAL PROGRAMMING (3).** Coreq., MH 264. Introduction to the organization and characteristics of the digital computer, and to programming in FORTRAN, with applications to problems in algebra and the calculus.
272. **MATHEMATICAL PROGRAMMING AND NUMERICAL ALGORITHMS (3).** Coreq., MH 265 and MH 266. Pr., MH 271. Introduction to numerical methods for solution of ordinary differential equations and systems of linear equations. Further programming practice in FORTRAN.
- 281-282. **ELEMENTARY MATHEMATICS (5-5).** Pr., sophomore standing. These courses provide appropriate mathematical insights for elementary school teachers. Emphasis is on the structure of the number systems, the basic concepts of algebra and informal geometry. Open for credit only to students in Elementary Education, except by special permission of the Department of Mathematics.
294. **CALCULUS FOR ENGINEERING AND SCIENCE (5).** Pr., MH 193. A continuation of MH 191-192-193. Sequences, infinite series introduction to complex variables.
301. **HISTORY OF MATHEMATICS (3).** Pr., MH 163 or departmental approval. The evolution of modern mathematics from its motivational roots in the physical sciences; the lives and contributions of outstanding mathematicians; the parallel development of mathematics and western culture.
- 331-332. **INTRODUCTION TO MODERN ALGEBRA I, II (5-5).** Pr., MH 163. Sets, mapping, the integers, isomorphisms, and homomorphisms; groups, rings, fields, ideals.
337. **INTRODUCTION TO LINEAR ALGEBRA (5).** Pr., MH 163. Matrices; systems of equations; determinants; vector spaces; linear transformations; inner products; unitary, Hermitian, and normal matrices; eigenvalues and eigenvectors; diagonalization of Hermitian matrices. Credit for this course precludes credit for MH 266.
339. **LINEAR PROGRAMMING (5).** Pr., MH 266 or 337. The general linear programming problem; feasible solutions; simplex method; cycling and degeneracy; duality theory; sensitivity analysis; applications.
362. **ENGINEERING MATHEMATICS I (3).** Pr., MH 265. Fourier Series, partial differential equations, special functions.
371. **DISCRETE MATHEMATICS FOR COMPUTER SCIENCE I (3).** Pr., MH 266 or 337. Elementary logic; predicate calculus; induction; finite state machines, deterministic and nondeterministic automata, regular grammars.
372. **DISCRETE MATHEMATICS FOR COMPUTER SCIENCE II (3).** Pr., MH 266 or 337. Equivalence relations, partial order relations, functions, n -ary relations. Graphs: special types, isomorphism, trees, traversal algorithms. Digraphs: transitive closure, connectivity.
399. **EXPERIMENTAL LEARNING IN MATHEMATICS (2).** Pr., MH 163. Not for credit toward major or minor in mathematics. General elective credit only. Maximum number of credit hours is 6.
508. **ELEMENTS OF NUMERICAL ANALYSIS (5).** Pr., MH 264. The numerical solutions of selected problems arising in calculus and algebra along with the programming techniques.
581. **FOUNDATIONS OF GROUP THEORY FOR SECONDARY SCHOOL TEACHERS* (4).** Pr., one course above MH 163. Elements of the theory of groups emphasizing geometric and other examples.
582. **FOUNDATIONS OF STATISTICS FOR SECONDARY SCHOOL TEACHERS* (4).** Pr., one course above MH 163. Discrete probability distributions; introduction to statistical inference.
583. **FOUNDATIONS OF LINEAR ALGEBRA FOR SECONDARY SCHOOL TEACHERS* (4).** Pr., one course above MH 163. Matrix algebra, quadratic forms with emphasis on geometric interpretations in two and three dimensions.
584. **FOUNDATIONS OF NUMBER THEORY FOR SECONDARY SCHOOL TEACHERS* (4).** Pr., one course above MH 163. Divisibility, Diophantine equations, congruences.
585. **FUNDAMENTALS OF ALGEBRA FOR SECONDARY SCHOOL TEACHERS* (4).** Pr., one course above MH 163. Structure of the ring of integers; polynomial rings.
586. **FOUNDATIONS OF NON-EUCLIDEAN GEOMETRY FOR SECONDARY SCHOOL TEACHERS* (4).** Pr., one course above MH 163. B. L. geometry, hyperbolic geometry, absolute geometry, parallel postulates.
587. **FUNDAMENTALS OF ANALYSIS FOR SECONDARY SCHOOL TEACHERS* (4).** Pr., one course above MH 163. Mathematical analysis with emphasis on basic principles and relationships. Students will develop the material from basic concepts.
- 588-589. **CERTIFICATION MATHEMATICS FOR SECONDARY SCHOOL TEACHERS* (5-5).** Pr., undergraduate major in mathematics and departmental approval. Summer. For secondary school teachers who are working toward Class A certification. Topics will be selected from analysis, algebra and geometry according to the needs and interests of the students enrolled.

*Not available to majors or graduate students in the area of science or mathematics.

Mathematics — Algebra, Combinatorics and Analysis (MHC)

Professors Wall, Head, Billington, Govil, Hill, Hoffman, Hudson, Johnson, Kallenberg, Manocha, Pate, Phelps, Uhlig, and Zalik
Alumni Professor Lindner

Associate Professors Albrecht, Leonard, Rodger, Schulz, Szulga, Teirlinck, and Veeh
Alumni Associate Professor Henderson

Assistant Professors Goeters, Hankerson, Harris, Jenda, Kilgore, Nair, Tam, Tsing, and Ullery

Instructors Gittings, Murphy, and Whitmire

479. **HONORS THESIS (3-6).** Pr., Senior status and enrollment in Auburn University Honors Program. May be repeated once for maximum of 6 hours credit.
491. **SPECIAL PROBLEMS (1-5).** Pr., departmental approval, junior standing. An individual problems course. Each student will work under the direction of a staff member on some problem of mutual interest.

ADVANCED UNDERGRADUATE AND GRADUATE

500. **MATHEMATICAL MODELING (5).** Pr., MH 265, 269, or 528; an ability to program in FORTRAN. Introduction to mathematical models and related techniques. Course includes both general principles involving continuous and discrete deterministic problems and a detailed, specific term-project.
503. **COMPLEX VARIABLES WITH APPLICATIONS I (5).** Pr., MH 265 or 269. Complex functions and their elementary mapping properties; Cauchy-Goursat theorem; contour integration and residues; Laurent series; applications to real integrals. The sequence MHC 503-504 is appropriate for students of engineering or science.
504. **COMPLEX VARIABLES WITH APPLICATIONS II (3).** Pr., MHC 503. Linear fractional transformations; conformal mappings; harmonic functions; applications to boundary value problems; analytic continuation; entire functions. The sequence MHC 503-504 is appropriate for students of engineering or science.
505. **MATRIX THEORY AND APPLICATIONS (5).** Pr., MH 266 or 531. Canonical forms, determinants, linear equations, characteristic value problems.
- 507-508. **INTRODUCTION TO APPLIED MATHEMATICS I, II (3-3).** Pr., MH 265, 266 or equivalent. Special functions, orthogonal polynomials, integral equations, boundary value problems, Sturm-Liouville theory, systems of ordinary differential equations and elements of linear control theory, Lie groups, singular perturbations, boundary layers, Zeeman and Stark effects, classification of catastrophe sets, bifurcation of equilibrium states in one dimension, Hopf bifurcation, nonlinear oscillations.
512. **INFORMATION THEORY (5).** Pr., MH 264. An introduction to discrete probability and its applications to coding. The concept of entropy as a measure of information is developed and applied to problems of coding, channel capacity, and error correction.
513. **ALGORITHMIC METHODS IN COMBINATORICS (5).** Pr., MH 266, MHC 575/577 or COI, and knowledge of a programming language. Basic algorithmic and computations methods used in the solution of fundamental combinatorial problems will be studied.
515. **ALGEBRAIC CODING THEORY I (5).** Pr., MH 266 or 337. Binary codes, linear codes, cyclic codes, Hamming codes, BCH codes; maximum likelihood decoding; error detection and correction; coset decoding.
516. **ALGEBRAIC CODING THEORY II (5).** Pr., MH 515. Theory of and implementable algorithms for codes of current practical and theoretical importance. Generalized BCH codes, Reed-Muller codes, Kerdock and Preparata codes, Reed-Solomon codes, quadratic residue codes, Justesen and concatenated codes, convolution codes.
518. **CRYPTOGRAPHY (5).** Pr., MH 332 or MHC 515 or COI. Classical cryptosystems, the Data Encryption Standard, the Rivest-Shamir-Adleman system and other public-key cryptosystems, trap-door functions, knapsack systems, factoring and primality testing, the discrete logarithm problem.
- 520-521-522. **ANALYSIS I, II, III (5-5-5).** Pr., MH 264. The real number system, theorems concerning number sets, sequences, graphs of functions; Riemann-Stieltjes integration, continuity, the derivative and functions of bounded variation; functions whose domains are in Euclidean spaces.
530. **THEORY OF DIFFERENCE EQUATIONS (3).** Pr., MH 265 or 269, and 266 or 337, or COI. Linear difference equations, initial value problems, Green's functions, boundary value problems, asymptotic properties, Sturm-Liouville theory, systems, periodic solutions, stability, Lyapunov functions, nonlinear difference equations, models.
531. **INTRODUCTION TO MODERN ALGEBRA III (5).** Pr., MH 332. A continuation of MH 331-332.
537. **LINEAR ALGEBRA (5).** Pr., MH 266 and 332. Linear transformations, matrix algebra, finite-dimensional vector spaces.
- 550-551. **NUMERICAL MATRIX ANALYSIS I, II (3-3)** Pr., MH 266 or 337 and the ability to program in an advanced level language. Direct and iterative methods for solving linear equations; error, conditioning and stability analysis; iterative and factorization techniques for the algebraic eigenvalue problem.
567. **PROBABILITY THEORY (5).** Pr., MH 264. An introduction to probability. Random variables, discrete and absolutely continuous distributions. The Poisson process. Expectation and conditional expectation. Moments and moment generating functions. Convergence and limiting distributions. Emphasis on problem solving.
568. **MATHEMATICAL STATISTICS I (5).** Pr., MH 567. An introduction to statistical methods. Estimation and maximum likelihood estimates. Sampling distributions, confidence intervals, hypothesis testing, the likelihood ratio test, sufficiency, completeness, and Rao-Blackwell theorem.

569. **MATHEMATICAL STATISTICS II (5).** Pr., MH 568. Analysis of variance, regression, and least squares. Sequential analysis. Bayesian estimation. Nonparametric methods.
571. **LINEAR OPTIMIZATION (5).** Pr., MH 266 or 337. Simplex algorithm and duality, shortest path, network flow, minimal cost flow, out-of-kilter method, assignment problems; matching; emphasis on both theory and algorithms for applied problems.
573. **ENUMERATION (5).** Pr., MH 264. Permutations and combinations, generating functions, inclusion-exclusion, cycles of permutations, occupancy, partitions, trees, Polya trees.
575. **GRAPH THEORY (5).** Pr., MH 163. Connectivity, traversability, coverings, planarity, colorability, digraphs, algorithms and applications.
577. **COMBINATORIAL DESIGNS (5).** Pr., MH 163. Latin squares, block designs, finite geometries, distinct representatives, difference sets.
591. **TOPICS IN PROBABILITY AND STATISTICS (1-5).** (May be repeated for credit). Pr., MH 567 or COI. A mathematical treatment of certain topics in probability and statistics. Topics will vary from year to year and will be chosen from the following: Applied stochastic process, time series, experimental design, sampling theory, non-parametric methods, and others.
598. **SPECIAL TOPICS (1-5).** Pr., COI. Topics may vary as needed. May be taken for credit more than once.

GRADUATE

- 600-601-602-603. **APPLIED MATHEMATICS I, II, III, IV (5-5-5-5).** Pr., approved graduate standing. Asymptotic series. Approximate solution of linear and nonlinear ordinary differential equations. Asymptotic expansion of Laplace and Fourier integrals. Regular and singular perturbation theory. Boundary layer theory. WKB theory. Multiple scale analysis. Asymptotic methods for difference equations. Acceleration of convergence. Pade approximation.
- 607-608-609. **THEORY OF PARTIAL DIFFERENTIAL EQUATIONS (3-3-3).** Pr., departmental approval. Linear theory, Holder spaces and classical solutions of elliptic problems, Sobolev spaces, weak solutions, regularity theory, semigroups, maximum principles, nonlinear problems, variational techniques, viscosity solutions.
610. **SPECIAL FUNCTIONS (5).** Pr., departmental approval. Infinite products, gamma and beta functions, asymptotic series, the hypergeometric function, generalized hypergeometric functions, Bessel functions, generating functions, polynomials of Legendre, Hermite, Laguerre, and Jacobi; elliptic functions, theta functions, Jacobian elliptic functions.
- 620-621-622. **ANALYSIS I, II, III (4-4-4).** Pr., MHC 522 or departmental approval. Measure and integration, metric spaces, introduction to complex analysis.
- 623-624-625. **FUNCTIONS OF A COMPLEX VARIABLE I, II, III (3-3-3).** Pr., departmental approval. Complex numbers, analytic functions, derivatives, Cauchy integral theorem and formulas, Taylor and Laurent series, analytic continuation, residues, maximum principles, Riemann surfaces, conformal mapping, families of analytic functions.
- 628-629. **ADVANCED THEORY OF DIFFERENTIAL EQUATIONS (5-5).** Pr., departmental approval. Existence, uniqueness and continuation theorems for ordinary and partial differential equations; nature of solutions. The first quarter will be devoted to ordinary equations, the second to partial differential equations.
- 630-631-632. **ALGEBRA I, II, III (4-4-4).** Pr., MH 332, 337, or departmental approval. Groups, rings, fields, modules, vector spaces.
633. **THEORY OF GROUPS (5).** Pr., MH 631. Sylow theory, abelian groups, chain conditions.
634. **THEORY OF RINGS (5).** Pr., MH 632 or departmental approval. Structure of rings, ideals in commutative rings.
635. **ABELIAN GROUPS (5).** Pr., departmental approval. An axiomatic development of abelian group theory: decomposition theorems, finitely generated groups, rank, divisible groups, pure subgroups, basic subgroups, ulm factors.
- 637-638-639. **MATRICES (3-3-3).** Pr., MH 537 or COI. Jordan form, functions of a matrix, spectral theorem, singular values, norms, quadratic forms, field of values, inertia; 639: selected topics of current interest.
- 640-641-642. **NORMED LINEAR SPACES (5-5-5).** Pr., departmental approval. Bounded linear transformations and linear functionals on Banach and Hilbert spaces, including conjugate spaces, adjoint operators, self adjoint operators, spectral theory, applications to particular spaces.
- 647-648-649. **FUNCTIONAL ANALYSIS (5-5-5).** Pr., MH 642 or departmental approval. Topics in the advanced theory of linear functionals and operators on Banach and Hilbert spaces, chosen to lead students into research work in this field.
650. **ADVANCED NUMERICAL MATRIX ANALYSIS (3).** Pr., MHC 550-551 or departmental approval. An indepth study of at least one of the following topics: discretisation matrices for partial differential equations and boundary value problems, sparse matrices, refinements for the QR-algorithm, symmetric eigenvalue problem, singular value decomposition, pseudo-inverses, simplex method, matrix algorithms for vector computers.
- 655-656-657. **LINEAR CONTROL THEORY I, II, III (3-3-3).** Pr., MH 265, 266. Linear control systems, controllability, observability, canonical forms, pole assignment, realizations, stability analysis for linear systems, stability and control, regulation and tracking, parameter space design, robust controllers, optimal control, computational aspects of control theory.
- 664-665-666. **PROBABILITY (5-5-5).** Pr., knowledge of Lebesgue integration. Probability measures, random variables, distribution functions (discrete, absolutely continuous, and singular), expectation, characteristic functions (Fourier transforms), independence, limit theorems, convergence to Poisson and normal distributions, central limit theorem, Stochastic processes and Brownian motion, probability measures on metric spaces.

- 670-671-672. **FINITE GEOMETRY (5-5-5).** Pr., MHC 537 or equivalent. The relationship between geometry and linear algebra is stressed over finite fields, as well as applications in combinatorial designs. Linear spaces, planar spaces, automorphism groups, closure spaces, dimension theory in closure spaces, projective and affine spaces over finite fields. Perspectives and projectivities. The fundamental theorem of projective geometry. Duality and polarities. Quadrics. Ovals and ovoids. Inversive, Laguerre and Minkowski planes. Selected other topics.
673. **ADVANCED TOPICS IN ALGEBRAIC CODING THEORY (5).** Structure and theoretical properties of codes are studied, including some of the topics: weight distributions of codes and duals, self-dual codes, cyclic codes, designs from codes and bounds on the size of a code.
675. **ADVANCED TOPICS IN GRAPH THEORY (5).** Pr., MHC 575. Topics of current interest and recent research in graph theory. Areas covered may include edge colorings of graphs, random graphs, Ramsey theory, network flows and algebraic graph theory.
677. **ADVANCED TOPICS IN COMBINATORIAL DESIGN THEORY (5).** Pr., MHC 577. Topics of current interest and recent research in combinatorial design theory. Areas covered may include latin squares, triple systems, embeddings and nestings of designs, orthogonal arrays, Steiner pentagon systems.
679. **SPECIAL PROJECTS IN COMBINATORICS (3).** A project is selected in conjunction with the student's advisory committee. This project is to be based on problems of current interest and may well involve the use of a computer.
680. **LINEAR MODELS I (5).** Pr., MH 505 or 537 or 568. A rigorous development of some of the important topics of applied statistics. Analysis of variance, covariance and regression. The multivariate normal distribution.
681. **LINEAR MODELS II (5).** Pr., MH 580. A continuation of MH 680.
682. **MULTIVARIATE ANALYSIS (5).** Pr., MH 681. Important topics in multivariate statistical analysis including Hotelling's T^2 distribution and its applications. Discriminant analysis, correlation. Wilk's Lambda criterion and the multivariate analysis of variance.
- 683-684-685. **STOCHASTIC PROCESSES (5-5-5).** Pr., MH 567. An introduction to stochastic processes, Markov chains and Markov processes. Renewal theory, stationary processes, spectral properties. Martingales and Brownian motion. Branching processes. Application to queueing theory.
689. **RESEARCH AND SPECIAL PROJECT IN PROBABILITY AND STATISTICS (CREDIT TO BE ARRANGED.)** (May be repeated for credit.)
690. **DIRECTED READING (CREDIT TO BE ARRANGED.)**
698. **SPECIAL TOPICS (1-5).** Pr., COI. Topics may vary as needed. May be taken for credit more than once.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be repeated for credit.
- 740-741-742. **ANALYSIS IV, V, VI (3-3-3).** Pr., MHC 622. Hilbert spaces, Banach spaces, bounded operators. Special topics of current research interest.
790. **DIRECTED READING (CREDIT TO BE ARRANGED.)** Pr., Registration in a doctoral program and COI.
798. **SPECIAL TOPICS (1-5).** Pr., COI. Topics may vary as needed. May be taken for credit more than once.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Mathematics — Foundations, Analysis and Topology (MHT)

Professors Kozlowski, Head, J. Brown, B. Fitzpatrick, Gruenhage, Heath, Hetzer, Holmes, K. Kuperberg, W. Kuperberg, Minc, Rogers, Smith, and Zenor
Associate Professors DeSouza, Ford, Hinrichsen, Sampson, Transue, and Young
Assistant Professors Baldwin, Beaudoin, Butler, Daniels,
M. Fitzpatrick, Lin, Schmidt, Slaminka, and Stuckwisch
Instructor S.J. Brown

479. **HONORS THESIS (3-6).** Pr., Senior status and enrollment in Auburn University Honors Program. May be repeated once for maximum of 6 hours credit.
491. **SPECIAL PROBLEMS (1-5).** Pr., departmental approval, junior standing. An individual problems course. Each student will work under the direction of a staff member on some problem of mutual interest.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **THE CALCULUS OF VECTOR FUNCTIONS (3).** Pr., MH 266 or departmental approval. Derivative and integral of vector functions, gradient, divergence, curl, Green's Theorem, Stokes Theorem.
502. **TENSOR ANALYSIS (3).** Pr., MH 264 and MHT 501. The Frechet derivative; tensors and tensor valued functions; coordinate transformations; contravariant tensors; tangent spaces; differential forms; wedge products of forms; Einstein summation convention (raising and lowering indices); Riemannian metrics.
506. **ELEMENTARY PARTIAL DIFFERENTIAL EQUATIONS (3).** Pr., MH 362. First and second order linear partial differential equations with emphasis on the methods of eigenfunction expansions.
- 510-511. **CALCULUS OF VARIATIONS I, II (3-3).** Pr., MH 265 or 269. Fundamental concepts of extrema of functions and functionals; the simplest problem of the calculus of variations; first and second variations; generalizations of the simplest problem; sufficient conditions; constrained functionals; the general Lagrange problem; optimal control.

- 520-521-522. **ANALYSIS I, II, III (5-5-5).** Pr., MH 264. The real number system; theorems concerning number sets, sequences, graphs of functions; Riemann-Stieltjes integration; continuity, the derivative and functions of bounded variation; functions whose domains are in Euclidean spaces.
524. **FOURIER ANALYSIS (5).** Pr., MHT 521 or MHC 521, an ability to program FORTRAN. Convergence and oscillation theorems for Fourier Series. Gibbs phenomenon. Fourier transform. Fast Fourier transform.
528. **SYSTEMS OF DIFFERENTIAL EQUATIONS AND APPLICATIONS (5).** Pr., MH 265 and 266 or equivalent. Linear systems of differential equations, stability, phase portraits, non-linear systems, linearization, qualitative properties of orbits, Poincaré-Bendixson Theorem; numerical methods; applications to various disciplines.
- 541-542. **GEOMETRY, A MODERN VIEW I, II (5-5).** Pr., MH 163. A development of geometry using the real number system and measurement as proposed by G. D. Birkhoff. The course moves rapidly, with definitions and proofs, through the foundations of geometry and into the main body of geometric theory.
543. **LINEAR GEOMETRY (5).** Pr., MH 163. Transformations in projective, affine, and Euclidean planes.
544. **COMBINATORIAL GEOMETRY IN THE PLANE (5).** Pr., MH 163. Helly's and related theorems.
547. **ONE-DIMENSIONAL DYNAMICAL SYSTEMS (3).** Pr., MH 265 or COI. An introduction to dynamical systems with an emphasis on applications. The study of the logistic equation will motivate this course which will include the following topics: bifurcation theory, chaos, hyperbolicity, symbolic dynamics, Sarkovskii's theorem, maps of the circle, homoclinic points and the theory of kneading sequences.
548. **MULTI-DIMENSIONAL DYNAMICAL SYSTEMS (3).** Pr., MHT 547 or COI. MHT 548 will extend the results of MHT 547 to multi-dimensional systems and will describe in addition, the new phenomena that occur. Topics to be considered will be: the Lorenz map, strange attractors, the horseshoe map, toral automorphisms, stable and unstable manifolds, periodic points and the Henon map.
549. **COMPLEX ANALYTIC DYNAMICAL SYSTEMS (3).** Pr., MHT 548 or COI. This course will focus upon the dynamics of analytic mappings of the complex plane. Topics to be considered will be: quadratic maps, Julia sets, normal families and exceptional points, periodic sets and the exponential map.
- 550-551. **METRIC SPACES (3-3).** Pr., MHT 521 or departmental approval. The elementary properties of metric spaces with special attention to the line and the plane.
555. **INTRODUCTION TO RECURSION THEORY (5).** Pr., MH 371 or departmental approval. Partial recursive functions, recursive and recursively enumerable sets. Church's Thesis. Acceptable enumerations, Kleene's T-predicate, and the recursion theorem. The halting problem, the jump operation, and Turing degrees. Other recursively unsolvable problems.
563. **INTRODUCTION TO NUMERICAL ANALYSIS I (5).** Pr., MH 265 or 269 and an ability to program in a high level language. Numerical solution of equations in one variable, polynomial approximation, numerical differentiation and integration, numerical solutions of ordinary differential equations, error analysis. Students will be expected to write computer programs using the algorithms discussed.
564. **INTRODUCTION TO NUMERICAL ANALYSIS II (5).** Pr., MH 266 or 337 and an ability to program in a high level language. Direct and iterative numerical solutions of systems of linear equations, numerical computation of eigenvalues and eigenvectors, error analysis. Students will be expected to write computer programs using the algorithms discussed.
565. **THEORY OF NONLINEAR OPTIMIZATION (5).** Pr., MH 264 and 266, or equivalent. Kuhn-Tucker conditions, quadratic programming, search methods and gradient methods, Lagrangean and penalty function methods.
566. **INTRODUCTION TO NUMERICAL ANALYSIS III (5).** Pr., MHT 563 and 564 or departmental approval. Approximation theory, numerical solution of systems of non-linear equations, singular value decomposition and least-square problems, direct and indirect methods for sparse matrices.
579. **EFFICIENT ALGORITHMS FOR COMPUTER PROGRAMS (3).** Pr., knowledge of linear algebra and a computer language. The construction of serial and parallel algorithms to perform various tasks (sorting for instance) is studied using techniques such as recursion, tree search, or divide-and-conquer and using numerous data structures such as heaps, queues, stacks, sets, binary trees and graphs. Of primary concern is the evaluation of the algorithm's efficiency by provably intractable problems (and how to recognize others) are also studied.
598. **SPECIAL TOPICS (1-5).** Pr., COI. Topics may vary as needed. May be taken for credit more than once.

GRADUATE

- 604-605-606. **APPLIED MATHEMATICS I, II, III (5-5-5).** Pr., approved graduate standing. Scalar, vector, and dyadic fields: equations governing fields; Helmholtz's and Laplace's equations in curvilinear coordinates; separation of variables; boundary conditions and eigenfunctions; Green's functions.
610. **SPECIAL FUNCTIONS (5).** Pr., departmental approval. Special functions from classical complex analysis which play an important role in the mathematics of physics, chemistry, and engineering.
613. **TENSOR ANALYSIS (5).** Pr., departmental approval. Manifolds, differential structure, vector and tensor fields, vector and tensor bundles, differential forms, chains. Topics among the following: differential operators (e.g. Lie derivative, affine connections), de Rham cohomology, Riemannian metric, curvature tensor.
614. **INTRODUCTION TO MODEL THEORY (5).** Pr., MH 331 and MH 371, or departmental approval. First-order languages. Satisfaction. Consequences. The completeness and compactness theorems, models constructed from constants. Elementary substructures and embeddings. Lowenheim-Skolem-Tarski theorems. Ultraproducts and ultrapowers.
- 615-616-617. **AXIOMATIC SET THEORY I, II, III (5-5-5).** Pr., departmental approval. An introduction to modern set theory. The ZF axioms, ordinals, cardinals, CH, GCH, stationary sets, diamond, Martin's axiom, and an introduction to the constructible universe, large cardinals, and forcing.

- 620-621-622. **REAL ANALYSIS I, II, III (5-5-5).** Pr., departmental approval. Measure theory and Lebesgue integration, metric spaces, introduction to functional analysis.
- 623-624-625. **COMPLEX ANALYSIS I, II, III (5-5-5).** Pr., departmental approval. Complex numbers, analytic functions, derivatives, Cauchy integral theorem and formulae, Taylor and Laurent series, analytic continuation, residues, maximum principles, Riemann surfaces, conformal mapping, families of analytic functions, harmonic analysis.
- 628-629. **ADVANCED THEORY OF DIFFERENTIAL EQUATIONS (5-5).** Pr., departmental approval. Existence, uniqueness and continuation theorems for ordinary and partial differential equations; nature of solutions. The first quarter will be devoted to ordinary equations, the second to partial differential equations.
630. **PARTIAL DIFFERENTIAL EQUATIONS I (5).** Pr., departmental approval. Introduction to second order linear elliptic and hyperbolic equations with an eye towards nonlinear and numerical problems, characteristics, domains of dependence, energy integrals, finite difference schemes, Sobolev spaces, maximum principle.
631. **PARTIAL DIFFERENTIAL EQUATIONS II (5).** Pr., MHT 630. Linear and nonlinear parabolic second order initial-boundary value problems, reaction-diffusion systems or Navier-Stokes equations, Galerkin method and finite elements. Aspects related to large scale computing should receive special consideration.
632. **PARTIAL DIFFERENTIAL EQUATIONS III (5).** Pr., MHT 631. Further topics from the nonlinear theory, such as conservation laws, shock-waves, travelling waves or attractors. Students should be led to own research work in p.d.e. or be prepared for computer studies involving complex systems of p.d.e.
- 640-641-642. **NORMED LINEAR SPACES (5-5-5).** Pr., departmental approval. Bounded linear transformations and linear functionals on Banach and Hilbert spaces, including conjugate spaces, adjoint operators, self adjoint operators, spectral theory, applications to particular spaces.
- 647-648-649. **FUNCTIONAL ANALYSIS (5-5-5).** Pr., MHT 642 or departmental approval. Topics in the advanced theory of linear functionals and operators on Banach and Hilbert spaces, chosen to lead students into research work in this field.
- 650-651-652. **GENERAL TOPOLOGY (5-5-5).** Pr., departmental approval. An axiomatic development of point-set topology: connectivity, compactness, separability, topological equivalence, well-ordering, inner limiting sets, Cartesian products.
653. **DIMENSION THEORY (5).** Pr., departmental approval. The topological study of dimension in separable metric spaces.
- 654-655-656. **POINT-SET TOPOLOGY (5-5-5).** Pr., MHT 652. Upper semi-continuous collections, indecomposable continua, metrization problems, inverse limits, other topics.
- 657-658. **EUCLIDEAN TOPOLOGY (5-5).** Pr., MHT 650. Topology with emphasis on those areas which distinguish among the polyhedra in Euclidean spaces (e.g., Theory of Retracts).
660. **ANALYSIS OF NUMERICAL METHODS (5).** Pr., MHT 563 and 564 or departmental approval. Interpolation and approximation, numerical solution of linear and nonlinear systems of equations and ordinary differential equations, numerical stability and error analysis. These topics will be treated at a more advanced level than in MHT 563 and 564. Emphasis will be placed on rates of convergence, propagation of errors and computational costs.
661. **NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (5).** Pr., MHT 564 or departmental approval. The numerical solution of partial differential equations using finite difference and finite element methods.
662. **ADVANCED TOPICS IN NUMERICAL ANALYSIS (5).** Pr., MHT 660 and 661 or departmental approval. Topics from the following list and other topics from the recent literature will be covered: solution of sparse systems of equations, parallel and vector algorithms, numerical methods for nonlinear and singular partial differential equations, calculation of eigenvalues and eigenvectors, generation of pseudo-random numbers, numerical filtering techniques.
665. **OPTIMIZATION THEORY (5).** Pr., MHT 565 or departmental approval. Unconstrained problems: basic descent, conjugate gradient, and quasi-Newton methods. Constrained problems: gradient projection, penalty, cutting plane, and Lagrange methods. (Credit not allowed for MHT 665 and IE 734.)
670. **UNIFORM SPACES (5).** Pr., MHT 652 and departmental approval. Uniform spaces, uniform topology, uniformly continuous functions, completions of uniform spaces, other topics.
- 680-681-682. **MEASURE THEORY AND DESCRIPTIVE SET THEORY I, II, III (3-3-3).** Pr., MHT or MHC 622 or equivalent, MHT 650 recommended. Relationships between certain classes of subsets of complete separable metric spaces and related classes of real functions: e.g. between the Borel classification of sets and the Baire classification of real functions. Basic theory of analytic and coanalytic sets and functions. The classes of Lebesgue measurable, universally measurable, and Marczewski measurable sets and functions. Sets and functions with the Baire property. Singular sets. Category analogs of standard theorems in measure theory.
690. **DIRECTED READING (CREDIT TO BE ARRANGED.)**
698. **SPECIAL TOPICS (1-5).** Pr., COI. Topics may vary as needed. May be taken for credit more than once.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be repeated for credit.
790. **DIRECTED READING (CREDIT TO BE ARRANGED.)** Pr., registration in a doctoral program and COI.
798. **SPECIAL TOPICS (1-5).** Pr., COI. Topics may vary as needed. May be taken for credit more than once.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Mechanical Engineering (ME)

Professors Crocker, Head, Beckett, Bussell, Carlson, Chin, Dyer, Goodling, Jemian, Jones, Penrod, Walker, and Wilcox
Associate Professors Jang, Madsen, Siginer, Sinha, Raju, and Yu
Assistant Professors Bhavnani, Christensen, Khodadadi, Knight, Kowbel, Suhling, Valaire, Wiens, and Zee

General Curriculum, GC, students (those with undeclared majors) may enroll only with departmental consent.

206. **MECHANICS OF MATERIALS I (3).** Pr., ME 205, MH 264, and ME 208 or equivalent computer programming skills. Coreq., MH 265. Fundamental concepts of stress and strain in two and three dimensions; stress-strain relations; uniaxial bar applications; torsion.
208. **ENGINEERING AND COMPUTER METHODS (3).** LEC. 2, LAB. 3. Pr., MH 163, Coreq. ME 205 and MH 264. Introduction to computer programming and engineering applications including linear and matrix algebra, linear equations, Taylor series, minimization and integration.
209. **COMPUTATION LABORATORY (2).** LEC. 1, LAB. 3. Pr., ME 208, Coreq. MH 265. Advanced computer programming with mechanical engineering applications including differential equations, graphics, data acquisition and control and probability and statistics.
301. **THERMODYNAMICS I (4).** Pr., MH 264, PS 222 and ME 208 or equivalent computer programming skills. Laws of thermodynamics; energy transformations; properties and relationships among properties; equations of state and simple processes and cycles.
302. **THERMODYNAMICS II (3).** Pr., ME 301, ME 209. Thermodynamic analysis of real and ideal cycles, and concepts of compressible fluid flow.
303. **THERMODYNAMICS III (3).** Pr., ME 301. Property determination, Maxwell's relations, thermodynamics of mixtures, combustion, and chemical equilibrium.
309. **MECHANICS OF MATERIALS LABORATORY (2).** LEC. 1, LAB. 3. Pr., ME 206 and ME 209. Determination of stress and strain fields by experimental techniques; uniaxial bar and torsion applications; introduction to strain gages, brittle coatings, and photoelasticity, failure criteria.
310. **THERMODYNAMICS (5).** Winter. Pr., MH 163 and PS 206 or equivalent. Gases and vapors; cycles; mass and heat transfer. Open to non-Mechanical Engineering students only.
316. **MECHANICS OF MATERIALS II (4).** LEC. 3, LAB. 3. Pr., ME 206, ME 309, and ME 209 or equivalent computer programming skills, or COI. Normal and shear stresses in beams, beam deflections, pressure vessels, combined loading and superposition, buckling of columns, applied elasticity.
321. **DYNAMICS I (4).** Pr., ME 205, ME 208 or equivalent computer programming skills. Coreq., MH 265. Kinematics of points, lines, and rigid bodies; relative motion and coordinate transformations; kinetics; conservation of energy and momentum.
322. **DYNAMICS II (4).** Pr., ME 209 and 321. Matrix methods in kinematics; introduction to celestial mechanics; Euler's equations of motion; the inertia tensor; gyroscopic motion.
323. **DYNAMICS OF MACHINES (4).** LEC. 3, LAB. 3. Pr., ME 206, 209, 322. Analysis of rotating systems. Dynamic force analysis of mechanisms and complexes of mechanisms. Oscillating systems.
340. **FLUID MECHANICS I (3).** Pr., ME 209 or equivalent computer programming skills; ME 301, 321. Coreq., ME 206 or 207. Fluid properties; fluid statics; fluid kinematics; integral forms of conservation laws — applications to exterior and interior flows; dimensional analysis.
341. **FLUID MECHANICS II (4).** Pr., ME 206 and 340; Coreq., ME 302, 322. Potential theory; vorticity; stream functions; viscous flow; boundary layers; turbulent flow.
412. **MEASUREMENTS LABORATORY (2).** LEC. 1, LAB. 3. Pr., ME 341, 303. Theory and practice of engineering measurements; treatment of experimental data, report writing, liquid and gaseous flow measurements, temperature, pressure, thermophysical properties.
415. **FLUIDS AND HEAT TRANSFER LABORATORY (2).** LEC. 1, LAB. 3. Pr., ME 412, 341 and 521. Selected experiments on fundamental concepts in fluid dynamics and heat transfer.
420. **THERMAL SYSTEMS LABORATORY (2).** LEC. 1, LAB. 3. Pr., ME 412, 415; Coreq., ME 515. Selected experiments on thermal systems evaluation.
434. **FLUID MECHANICS AND HEAT TRANSFER (5).** Pr., ME 310. Spring. Mechanics of compressible and incompressible fluids; transmission of heat by conduction, convection, and radiation. Open to non-Mechanical Engineering students only.
439. **MECHANICAL ENGINEERING DESIGN I (4).** LEC. 3, LAB. 3. Pr., ME 323, 316; Coreq., ME 335, 527. Design of machine elements for static and dynamic stresses with the emphasis on synthesis and creative design.
440. **MECHANICAL ENGINEERING DESIGN II (3).** LEC. 2, LAB. 3. Pr., ME 439, or departmental approval, senior standing. The solution of typical engineering systems problems by group or team effort, requiring the development of skill and co-operation in the use of analysis, synthesis, creative design and optimization.
441. **ENGINEERING SYSTEMS (CREDIT 1-5).** Pr., senior standing and departmental approval. May be taken more than one quarter, but total credit may not exceed 10 quarter hours. Design problems requiring the use of analysis, synthesis and creativeness in the design of engineering systems.

442. **COMPUTER AIDED DESIGN (3).** LEC. 2, LAB. 3. Pr., ME 439. The design of components and machines in an interactive computer environment. Utilization of graphics and component design programs as design tools.
444. **DESIGN FOR HAZARD REDUCTION (4).** Pr., ME 207, 321. Relationships of the mechanics of machinery and the properties of materials which lead to the design principles of hazard reduction in machines and machine systems. Open to non-Mechanical Engineering students only.
449. **PROFESSIONAL DIAGNOSTIC PROBLEMS (4).** Pr., senior standing in any engineering curriculum or departmental approval. Problems involving interaction of engineering science disciplines, with emphasis on engineering design, synthesis, and systems.
450. **SPECIAL PROBLEMS (CREDIT 1-5).** Pr., departmental approval, junior standing. Individual student endeavor under staff supervision involving special problems of an advanced nature. May be taken more than one quarter but total credit may not exceed 10 quarter hours. Maximum any one quarter 5 hours credit.
451. **ADVANCED PROJECTS (3).** LEC. 1, LAB. 6. Pr., ME 341, 521; Coreq., ME 442, and senior standing. Group or individual projects involving both analysis and synthesis, culminating in a formal presentation or report.
479. **HONORS THESIS (1-6).** Pr., COI and departmental approval. Individual student directed research and writing of honors thesis. (ME Honors Program students only. May be repeated once for a maximum of 6 total credit hours.)

ADVANCED UNDERGRADUATE AND GRADUATE

501. **STATISTICAL THERMODYNAMICS (3).** Pr., ME 301 or departmental approval. Fundamental laws of thermodynamics and thermodynamic properties from the microscopic point of view.
502. **INTRODUCTION TO OPTIMAL SYSTEMS (4).** Pr., MH 510. Application of optimal criteria to engineering problems.
503. **SENSITIVITY ANALYSIS (5).** Pr., IE 410 or equivalent and junior standing. Analysis of the sensitivity of performance of a system or process to changes in the parameters of the system.
510. **POWER PLANT SYSTEMS (5).** LEC. 3, LAB. 4. Pr., ME 302, senior standing. Theory, design, performance and applications of power plant systems.
514. **TURBOMACHINES (4).** Pr., ME 341 or departmental approval. Applications of fluid mechanics to turbomachines, such as pumps, compressors, fluid couplings, control devices, gas and steam turbines.
515. **THERMODYNAMICS OF POWER SYSTEMS (4).** Pr., ME 302, 303, 341; Coreq., ME 521 or departmental approval. Design and analysis of static and dynamic thermal power systems.
521. **HEAT TRANSFER (4).** Pr., ME 340, EE 302, MH 265, or departmental approval. Fundamentals of heat transfer by steady and unsteady conduction, radiation and free and forced convection.
522. **TRANSPORT PROCESSES (3).** Pr., ME 521 or departmental approval. Transport processes involving mass, momentum, energy transfer, heat and mass transfer in boundary layers, phase change heat transfer and heat exchangers.
523. **INTRODUCTION TO CONTINUUM MECHANICS (4).** Pr., MH 265 or departmental approval. Kinematics of deformation and motion; fundamental laws and field equations for a continuum; constitutive equations for various types of materials. Applications to solid and fluid mechanics.
524. **ENERGY UTILIZATION (3).** Pr., ME 521; coreq., ME 515. Overview of energy sources and conversion systems, followed by energy auditing, efficiency improvements and design procedures for minimizing energy utilization in industrial settings.
527. **DYNAMICS OF PHYSICAL SYSTEMS (4).** Pr., ME 323, 340. Motion of systems represented by first and second order differential equations. Transient types and response of physical systems. Transfer functions.
528. **AIR CONDITIONING AND REFRIGERATION (4).** Pr., ME 302, 521. Theory and design of heating, cooling and ventilating systems, and refrigeration systems.
532. **AUTOMATIC CONTROLS (3).** Pr., MH 265, ME 341, 527. Control systems fundamentals. Systems analysis techniques. Applications to machine and process control.
539. **FINITE ELEMENT ANALYSIS (4).** Pr., ME 316, MH 264, departmental approval. Development of finite element methods with emphasis on Mechanical Engineering applications. Deformable body, thermal and transient problems are considered.
543. **PHOTOELASTIC STRESS AND STRAIN ANALYSIS (3).** Pr., ME 316. Theory of photoelasticity; two- and three-dimensional model making and preparation; techniques of data collection and photoelastic models and analysis.
545. **BASIC STRESS ANALYSIS AND DESIGN THEORY (3).** Pr., ME 205. A rational approach to design. Concepts of stress, strain, relations between stress and strain, differential equations of equilibrium, compatibility equations, and boundary conditions are formulated. Applications to setting up the necessary field equations subject to the boundary conditions will be included.
546. **DESIGNING WITH FINITE ELEMENT ANALYSIS (4).** Pr., ME 316. The finite element technique is developed and applied for analysis of design components. Applications to discrete systems such as trusses and application to continuous systems that are static and dynamic are included.
547. **DESIGNING EXPERIMENTALLY WITH PHOTOELASTICITY (4).** Pr., ME 316. Development of the theory for photoelasticity. Use of a polariscope and model making. Application to designing load-carrying components. Designing the component boundary shape to minimize the stress field.

GRADUATE

604. **ADVANCED THERMODYNAMICS I (3).** Pr., ME 303, graduate standing. Classical thermodynamics of reactive and nonreactive systems; applications.

605. **ADVANCED THERMODYNAMICS II** (3). Pr., ME 303. Statistical treatment of the properties of thermodynamic systems; applications.
608. **ADVANCED THERMODYNAMICS III** (3). Pr., ME 605. Thermodynamics of nonequilibrium processes.
620. **HEAT TRANSMISSION — CONDUCTION** (3). Pr., ME 521, MH 362 or departmental approval. Formulations and solutions of steady, steady periodic, and unsteady heat conduction problems.
621. **HEAT TRANSMISSION — CONVECTION** (3). Pr., ME 521. General problems of convection: forced convection, free convection, laminar and turbulent boundary layers, heat transfer to liquid metals.
622. **HEAT TRANSMISSION — RADIATION** (3). Pr., ME 521. Fundamental laws of radiation, net radiation methods, configuration factors.
623. **NUMERICAL METHODS IN HEAT TRANSFER** (3). Pr., ME 521, ME 341, or equivalent. Conduction, convection, and radiation heat transfer with emphasis on numerical solution techniques used in problems for which no analytical solution exists.
630. **ADVANCED STRENGTH OF MATERIALS** (3). Pr., ME 316, MH 362 or departmental approval. Stress and strain analyses of curved beams and beams on elastic foundations; energy methods; selected topics from the literature; stress and strain analyses in bars of noncircular section subjected to torsion.
631. **THEORY OF ELASTICITY I** (3). Pr., departmental approval. Theory of stress and strain, and stress-strain relations. Laws of balance of momentum, moment of momentum, and energy. Solution by tensor stress function and displacement functions.
632. **THEORY OF ELASTICITY II** (3). Pr., ME 631. Continuation of solutions by potential functions. Solutions of two dimensional problems by Kolosov-Muskhelishvili methods.
633. **EXPERIMENTAL STRESS ANALYSIS** (3). Pr., ME 316. Stress analyses by experimental techniques including transmission and scattered light photoelasticity, strain gages, brittle coatings, photoelastic coatings, Moiré patterns, and holography.
634. **ELASTIC STABILITY** (3). Pr., ME 631 or departmental approval. Stability of conservative and nonconservative systems. Buckling of slender bars and thin-walled cross-sections; buckling of plates and shells. Buckling loads by Rayleigh-Ritz, Galerkin, and Kantorovich methods.
635. **INTERMEDIATE DYNAMICS** (3). Pr., MH 362. Dynamics of particles and systems of particles applied to engineering problems. Work and energy, and impulse and momentum principles. LaGrange's equations and Hamilton's principle.
637. **THEORY OF PLATES** (3). Pr., ME 631. Analyses of plates of various shapes under transverse and in-plane loadings and various boundary conditions. Buckling of plates due to in-plane loadings. Introduction to von Karman large deflection theory.
638. **THEORY OF SHELLS** (3). Pr., departmental approval. Introduction to differential geometry. Development of governing equations for shells under arbitrary loading. Shallow shell theory with applications. Asymptotic methods for solution of differential equations in shell theory.
639. **VARIATIONAL MECHANICS** (3). Pr., departmental approval. The problem of Bolza, Mayer and LaGrange with fixed and variable end points; Hamilton's principle and LaGrange's equations; energy methods; Rayleigh's principle and Rayleigh-Ritz method; Galerkin method; variational methods; applications.
640. **FLUID DYNAMICS** (3). Pr., MH 362 and graduate standing. Navier-Stokes Equations. Exact and approximate solutions. Euler's equations. Continuity. Energy equations. Irrotational flow.
641. **BOUNDARY LAYER THEORY** (3). Pr., ME 640. Hydrodynamic and thermal boundary layers. Prandtl's equations, integral relations and approximate techniques.
642. **GAS DYNAMICS I** (3). Pr., ME 640. Compressible flow equations; Isentropic flow; Fanno line flow; Rayleigh line flow; shock waves; high speed flow; internal and external flows; forces on immersed bodies.
643. **GAS DYNAMICS II** (3). Pr., ME 642 and 605. Continuation of ME 642 with emphasis on real gas effects and non-equilibrium flow.
644. **TURBULENCE** (3). Pr., ME 641. Analysis of wall-affected and free turbulent flows.
675. **PLANAR MECHANISMS** (3). Pr., ME 323. Analysis of simple and complex planar mechanisms. Synthesis by finite displacement and infinitesimal motion methods.
676. **SPATIAL MECHANISMS** (3). Pr., ME 675. Analysis and synthesis of spatial mechanisms.
677. **SELECTED TOPICS IN MECHANICAL DESIGN** (3). Pr., ME 630 and 685. Dynamic properties of trains of mechanisms; hydrostatic and hydrodynamic lubrication; thermal equilibrium; wear and fatigue problems; design techniques utilizing modern computational facilities.
678. **CONCEPTUAL DESIGN OF MECHANICAL SYSTEMS** (3). Pr., ME 440 or departmental approval. Engineering problem definition; solution set development; selection criteria; optimization techniques; utilization of computational methods in the design of components.
679. **DYNAMIC SYSTEMS DESIGN** (3). Pr., ME 527 or departmental approval. Design of time-responsive systems; system modeling and simulation; development of system component requirements; determination of the characteristics of the designed systems.
680. **NOISE CONTROL IN MECHANICAL SYSTEMS** (3). Pr., departmental approval. Sound: its propagation; reflection; absorption; scattering; sources in machinery. Alteration of machine parameters for noise reduction.
681. **DESIGN FOR OPTIMUM ENERGY UTILIZATION** (3). Pr., ME 604 or departmental approval. Design and selection of energy systems for optimum energy utilization in commercial, industrial, residential and transportation sectors.

- 682. ENVIRONMENTAL SYSTEMS DESIGN (3).** Pr., ME 604 or departmental approval. Design of environmental systems for the support of life, for comfort, for control of local environmental envelopes.
- 683. SOLAR ENERGY UTILIZATION (3).** Pr., ME 622 or departmental approval. Extra-terrestrial and available solar radiation, review of heat transfer, transmission and absorption of radiation, design of flat plate collectors, concentrating collectors, energy storage, applications of solar energy.
- 684. COMBUSTION AND FUEL TECHNOLOGY (3).** Pr., ME 303 and 521. Conventional and nonconventional fuels, thermodynamics and chemical kinetics of combustion processes, diffusional and kinetically controlled combustion processes, knocking in internal combustion engines, and instability of flame fronts.
- 687. AUTOMATIC MACHINERY AND PROCESS (5).** Pr., ME 532 or equivalent. Analysis and control of automatic machinery and automatic processes. Design and layout of production machinery for automatic and continuous flow.
- 688. PRODUCTION ENGINEERING LABORATORY (2-5).** Pr., MTL 537 or equivalent. Actual production problems associated with highly engineered products are addressed with the goal of reducing transition problems between prototype and full production of high-technology components and systems.
- 689. ENGINEERING DESIGN PROJECT. (CREDIT TO BE ARRANGED.)** May be taken more than one quarter. Pr., departmental approval. Non-thesis option in the Master of Mechanical Engineering program. Project description and objective must be stated in letter requesting approval to take course. Provides a separate course for the student wishing to complete an engineering design project as required in the non-thesis option.
- 690. SEMINAR (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 691. DIRECTED READING IN MECHANICAL ENGINEERING (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 692. ENGINEERING ANALYSIS (3).** Pr., departmental approval. Equilibrium, eigenvalue, and propagation problems of continuous systems. Physical laws and mathematical properties discussed with considerable emphasis on numerical solutions.
- 699. RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 799. RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Military Science (MS) GENERAL MILITARY COURSE (Basic Program) Military Science I

- 101. THE U.S. ARMY TODAY (1).** LEC, LAB. Overview of the United States Army and its role in American society. Lab provides practical experience in military training, leadership, and rappelling.
- 102. CONTEMPORARY MILITARY ISSUES (1).** LEC, LAB. An opportunity for students to research, analyze and discuss current issues involving the military. Lab provides practical experience in military training and leadership.
- 103. MODERN MILITARY WEAPONS AND OPERATIONS (2).** LEC, LAB. In-depth instruction in the use of military weapons, tactics and operations by the United States Army and its allies as well as those used by the Communist Bloc nations. Lab provides practical experience in military training and leadership.
- 104. MOUNTAINEERING (2).** LAB. 2. Pr., FR/SO only. Basic rappelling techniques. Requires a weekend field training exercise with climbing and rappelling at Talledega National Forest.
- 105. PISTOL MARKSMANSHIP (2).** LAB. 2. Pr., FR/SO only. Basic instruction and pistol firing exercises covering various shooting positions. Instruction is designed to expose the student to marksmanship as a challenging recreational sport.
- 139. WILDERNESS SKILLS (2).** LAB. 2. Pr., FR/SO only. Introduction to camping techniques in a woodland environment, emergency first aid procedures, shelter preparation, and food procurement.
- 162. RIFLE MARKSMANSHIP (2).** LAB. 2. Pr., FR/SO only. Introductory course in rifle marksmanship in three position target shooting. Designed to familiarize students with rifle marksmanship as a challenging recreational sport.

Military Science II

- 201. MILITARY POWER AND NATIONAL SECURITY (1).** LEC, LAB. Examines the purpose, structure, and function of the United States national security system vis-a-vis the Soviet national security system. Lab provides practical experience in military training and leadership.
- 202. MAP READING AND TROOP LEADING PROCEDURES (1).** LEC, LAB. Basic introduction into the military arts of map reading and operational planning using the standard U.S. Army Troop Leading Procedures. Lab provides practical experience in military training and leadership.
- 203. LEADERSHIP AND MANAGEMENT (1).** LEC, LAB. Basic introduction to the principles and techniques of leading and managing people, material and other resources. Lab provides practical experience in military training and leadership.

(Advanced Program) Military Science III

- 301. LAND NAVIGATION TECHNIQUES (3).** LEC. 3. LAB. Detailed map reading instruction. Includes a day and night land navigation practical exercise conducted at Ft. Benning, Ga.

302. **MILITARY TRAINING AND INSTRUCTION (3).** LEC. 3, LAB. Introduction to the U.S. Army's Training Management System. Applied practical exercises in planning, coordinating, and executing military training. Conduct of a live-fire M16A1 rifle practical exercise at Ft. Benning, Ga.
303. **MILITARY QUALIFICATION SKILLS (3).** LEC. 3, LAB. Hands-on military training in the basic skills common to all junior officers. Culminates with a weekend practical skills application exercise at Ft. Benning, Ga.
305. **RANGER OPERATIONS AND TACTICS (2).** LAB 2. Basic Ranger Operations to include patrolling, airmobile operations, mountaineering, light infantry weapons, and land navigation. Frequent field training exercises will be conducted (at least two per quarter).

Military Science IV

401. **MILITARY JUSTICE AND ETHICS (3).** LEC. 3, LAB. Introduction to the Military Justice System and the military ethic.
402. **ADVANCED LEADERSHIP AND MANAGEMENT (3).** LEC. 3, LAB. Intermediate instruction in the principles and techniques leadership and management.
403. **ADVANCED MILITARY LEADERSHIP AND MANAGEMENT II (3).** LEC. 3, LAB. Comprehensive instruction in the principles of small unit leadership and management.
404. **LEADERSHIP LAB (0).** LAB. 2. Required for advanced ROTC cadets not enrolled in ROTC courses during a quarter due to leave of absence or completion of all commissioning requirements.

Music (MU)

Professors Moore, Rosenbaum, Smith, Tamblin, Walls, and Vinson
Associate Professors Kafer, Head, Bennett, Faust, C. Gossett, Greenleaf, Howard,
J. Morgan, L. Morgan, Richardson, Stephenson, Summerville, and Alexander
Assistant Professors Hall, Harrison, and Wylie
Instructor S. Gossett

(T) indicates courses taught primarily for music education students.

100. **PERFORMANCE ATTENDANCE (0).** All quarters. Required of all music students each quarter. Performance & lectures by faculty, guest artists, and students. Music & music education majors are expected to perform at the teacher's discretion and in accordance with departmental rules.
- 131-132-133. **MATERIALS AND ORGANIZATION OF MUSIC (5-5-5).** A systematic study of harmony, counterpoint, form and style through the literature of music.
- 201-202-203. **JAZZ PIANO (1-1-1).** Idiomatic harmonic and melodic exercises and their application to the jazz literature, including standard tunes and improvisational situations.
- 211-212. **SERVICE PLAYING (1).** Hymn playing, modulation, selected anthems and oratorio selections, simple improvisation and transposition.
- 231-232-233. **MATERIALS & ORGANIZATION OF MUSIC (5-5-5).** Pr. MU 133. Continuation of the study of harmony, counterpoint, form and style in music.
- 251-252-253. **SURVEY OF MUSIC LITERATURE (1-1-1).** LEC. AND LAB. 3-3-3. Presentation of instrumental solo, opera and symphonic music, acquainting the student with musical compositions and composers with emphasis on music literature of the past three centuries.
300. **INTRODUCTION TO ELECTRONIC MUSIC (3).** Pr., COI. An introduction to the literature of and study of the basic production techniques of electronic music.
311. **LITURGIES (3).** Liturgical worship service of Roman Catholic and Protestant churches, plus non-liturgical forms of other Protestant denominations.
312. **HYMNOLOGY (3).** The musical significance of hymns of the Christian church from the earliest times to the present.
- 331-332-333. **MATERIALS AND ORGANIZATION OF MUSIC (5-5-5).** Pr., MU 233. Continuation of second year systematic study of harmony, counterpoint, form and style through the literature of music.
- 334-335-336. **MUSIC COMPOSITION I, II, III (1-1-1).** Pr., MU 233. Creative experience of various techniques in smaller design and apparatus.
- 337-338-339. **MODERN HARMONY I, II, III (3-3-3).** Pr., MU 233. Twentieth century harmonic devices. An integrated approach to understanding contemporary writing with emphasis on original work and analysis of the principal departments from "traditional" harmony.
- 341-342-343. **JAZZ, IN THEORY AND PRACTICE (3-3-3).** Pr., MU 233 or COI. The application of traditional theoretical concepts and skills to the jazz literature.
- 344-345-346. **JAZZ REPERTOIRE (3-3-3).** Pr., MU 203. Harmonic and formal analysis of standard jazz literature, with emphasis on reharmonization and variation, leading to the development of a professional level repertoire.
- 351-352-353. **MUSIC HISTORY I, II, III (3-3-3).** Pr., MU 133. Development of music from early times to the present day. Lectures, recorded examples, readings.
- 361-362-363. **CONDUCTING I, II, III (2-2-2).** Pr., MU 133. I. Basic conducting technique and introduction to score reading. II. Advanced conducting technique, score reading, and interpretation with specialization in either choral or instrumental areas. III. Advanced conducting techniques and score reading with opportunity for practical experience in preparing choral groups and instrumental groups for performance.

371. **INTRODUCTION TO MUSIC (3).** Open to Elementary Education and Family and Child Development Majors only. The understanding of music including an explanation of basic terms, notations, rhythm, tonal system, vocal and piano score readings.
- 409T. **MARCHING BAND TECHNIQUES (3).** Fundamental methods and procedures of the Marching Band.
- 410T. **ORCHESTRAL TECHNIQUES (3).** Pr., junior standing. Methods and procedures of rehearsing the orchestra in areas of articulation, tone production, blend, balance, intonation, and musical expression.
- 411T. **CHORAL TECHNIQUES (3).** Pr., junior standing. Methods and procedures of rehearsing choral groups in areas of diction, tone production, blend, balance, intonation, and musical expression.
414. **CARE AND REPAIR OF MUSICAL INSTRUMENTS (1). LEC. 1, LAB. 3.** Pr., senior standing. Selection, care and repair of woodwind, brass and string instruments with emphasis on adjustments which should be made by the instrumental director.
415. **ORGAN LITERATURE AND DESIGN (3).** Survey of organ literature correlating the forms of compositions and types of organs for which the music was written.
416. **CHURCH MUSIC SEMINAR (3).** Pr., MU 311, 312, 361, 362, 415, or 422, or COI. The processes of establishing a complete Church Music program. Supervised directing of choral ensemble.
- 434-435-436. **MUSIC COMPOSITION I, II, III (3-3-3).** Pr., 233. Analysis, study, and writing of musical compositions in small, compound, and larger musical forms with emphasis on both stylistic and individual creative writing.
- 437-438-439. **JAZZ IMPROVISATION (3-3-3).** Pr., MU 346. Practical, supervised performing experiences, with opportunity for practical experience with university and professional ensembles.
- 442T. **VOCAL PEDAGOGY (3).** For prospective voice teachers. An intensive study of the materials and methods of voice training. Classification and analysis of teaching repertoire.
- 443T. **STRING PEDAGOGY (3).** Mechanics of stringed instruments. Teaching methods, schools, and systems. Teaching literature and repertoire. For either violin, viola, cello, string bass or harp.
- 444T. **INSTRUMENTAL PEDAGOGY (3).** Mechanics of brass or woodwind instruments. Teaching methods and repertoire with emphasis on solo instrumental literature.
445. **THEORY PEDAGOGY (3).** Required of seniors majoring in theory and composition. Designed to present the problems of sight-singing, rhythmic dictation, melodic and harmonic dictation, and part writing from a pedagogical viewpoint.
- 447-448-449. **PIANO PEDAGOGY (3-3-3).** For prospective piano teachers. Teaching methods for beginners in private and group instruction. The intermediate and advanced student. Analysis of teaching repertory. Observation and practical experience.
452. **VOCAL LITERATURE (3).** Pr., junior standing. Vocal literature from Elizabethan time to the present, including representative European and American repertoire.
- *454. **INSTRUMENTAL LITERATURE (3).** Pr., junior standing.
455. **OPERA LITERATURE (3).** Pr., junior standing. Vocal music of the opera from the Baroque to the present time.
- **457-458-459. **KEYBOARD LITERATURE (1-1-1).** Pr., junior standing. Masterwork for keyboard from the Baroque Period to the present.
461. **ANALYSIS OF JAZZ MASTERWORKS (3).** Pr., MU 346. The study of recorded performances by important performers and composers, including compositional and stylistic analysis, and the transcription of improvisational solos.
- 462-463. **JAZZ COMPOSING AND ARRANGING (3-3).** Pr., MU 346. Emphasis on original work, and the arranging of existing material for large and combo instrumental ensembles, and for vocal ensembles.
- 471-472-473. **PIANO SKILLS AND TEAM TEACHING (PRACTICUM) (2).** Discussion of Piano Skills as they are taught through student literature. Supervised individual, and Team Teaching and observation of identified excellent teachers of pre-college students.
477. **INSTRUMENTAL ARRANGING (3).** Pr., MU 233 or COI. Project course in arranging various instrumental combinations from quartet to symphonic band.
478. **CHORAL ARRANGING (3).** Pr., MU 233 or COI. Project course in arranging for various combinations.

ADVANCED UNDERGRADUATE AND GRADUATE

- 522-523-524. **THEORY REVIEW (3-3-3).** No credit for Applied Theory Composition or Pedagogy Majors. Harmonic techniques of the 18th and 19th centuries, with special emphasis on style and design.
- 537-538-539. **ORCHESTRATION I, II, III (3-3-3).** Pr., MU 233. Ranges, notation, and characteristics of orchestral instruments. Exercises in arranging for combinations of string and wind instruments. Theory and practice of orchestration for full orchestra.
553. **CHORAL LITERATURE (3).** Pr., junior standing. Chronological study of choral music from the Middle Ages to the present including opera, and oratorio with detailed examination of representative works.
554. **HISTORY AND LITERATURE OF THE WIND BAND (3).** Pr., junior standing. History of development of the wind band and its literature from ca. 1500 to the present.

GENERAL ELECTIVE COURSES

130. **FUNDAMENTALS OF MUSIC (3).** Music primarily to develop functional piano skills, sight-reading, rhythm and melodic skills, and the basics of musical construction (scales, intervals, keys, and triads).
372. **HISTORY OF JAZZ (3).** The growth of Jazz from its African and European roots to current experimentation.

373. **APPRECIATION OF MUSIC (3).** May not be taken for credit by Music Majors or Minors. Outstanding composers and compositions. No previous music training required; an orientation in the art of listening.
374. **MASTERPIECES OF MUSIC (3).** May not be taken for credit by Music Majors or Minors. Representative musical works of each great period of musical history. No previous music training required.

GROUP PERFORMANCE COURSES

- 121-122-123. **UNIVERSITY SINGERS (1 HOUR CREDIT PER QUARTER).** May be taken with or without credit. A select choral ensemble for study and performance of madrigals, pop music, show tunes, and choral music of the jazz idiom. Open to any Auburn student by audition only.
- 124-125-126. **CONCERT BAND (1 HOUR CREDIT PER QUARTER).** Members of the Band are selected during the first week of each quarter. A minimum of 4 rehearsal hours per week is required, with extra rehearsals scheduled as necessary. Band members are required to be present at all rehearsals and all public performances. Students enrolled in Concert Band will have the drill portion of Basic Military Training waived. (May be taken with or without credit.)
- 127-128-129. **ORCHESTRA (1 HOUR CREDIT PER QUARTER).** Members of the symphonic orchestra are selected by try-outs during the first week of each quarter. (May be taken with or without credit.)
134. **JAZZ LABORATORY BAND (1).** A musical ensemble for the study and performance of music relating to the jazz idiom. By audition only.
- 141-142-143. **GOSPEL CHOIR (1-1-1).** Open to any Auburn student by consent of director. (May be taken with or without credit.)
- 218-219-220. **WOMEN'S CHORUS (1-1-1).** Open to any Auburn female student by consent of choral director. (May be taken with or without credit.)
- 221-222-223. **MEN'S CHORUS (1-1-1).** Open to any male Auburn student by consent of choral director. (May be taken with or without credit.)
224. **MARCHING BAND (1 HOUR CREDIT PER QUARTER).** Fall Quarter only. Provides music for athletic contests and half-time shows at football games, various parades, pep rallies, and other campus and off-campus events. During the fall quarter, will rehearse a minimum of 6 hours per week. Physical Education may be waived for members of the Marching Band. In addition, students will have the drill portion of basic military waived when enrolled in Marching Band. See Band Director for details. (May be taken with or without credit.)
- 227-228-229. **OPERA WORKSHOP (1 HOUR CREDIT PER QUARTER).** Open to all students interested in opera, including performance, stage-craft, make-up, conducting, and coaching. A minimum of three hours per week rehearsal or stage-craft is required with extra time scheduled as necessary. (May be taken with or without credit.)
- 321-322-323. **CONCERT CHOIR (1 HOUR CREDIT PER QUARTER).** Concert choir is a mixed chorus for study and performance of serious choral literature; open to any Auburn student by audition only. (May be taken with or without credit.)
- 324-325-326. **MUSIC ENSEMBLE (1 HOUR CREDIT PER QUARTER).** COI. Primarily for advanced musicians for the study and performance of musical compositions for small instrumental and vocal groups. A minimum rehearsal of three hours per week required. (May be taken with or without credit.) Includes brass, woodwind, percussion and piano ensembles.
327. **PIANO ENSEMBLE (1 HOUR CREDIT PER QUARTER).** Study through performance of the ensemble literature for keyboard. May be repeated for credit.
- 424-425-426. **MUSIC ENSEMBLE (1).** Pr., COI. Primarily for advanced musicians for the study and performance of musical compositions for small instrumental and vocal groups. A minimum rehearsal of three hours per week required. (May be taken with or without credit.) Includes brass, woodwind, percussion, and piano ensembles

*The literature of the major performance area.

**Restricted to piano pedagogy majors only.

PERFORMANCE

Individual instruction is available in voice, piano, organ, strings, woodwinds, harp, brass and percussion. One 1 hour lesson or two half-hour lessons per week.

Students desiring study in performance must be approved by the Head of the Department of Music before entrance into the course.

080. **PERFORMANCE (0).** May be repeated. Individual instruction in instrumental or vocal areas. Rudimentary practice as related to each discipline.
181. **PERFORMANCE (3).** Individual instruction in instrumental or vocal areas for performance, church music majors only. May be repeated.
184. **PERFORMANCE (1).** Individual instruction in instrumental or vocal areas. For piano pedagogy, theory/composition, bachelor of arts majors, and music education minors. May be repeated.
187. **PERFORMANCE (1).** Individual instruction in instrumental or vocal areas. For students in elementary and secondary education, and performance minors and electives. May be repeated.
381. **PERFORMANCE (3).** Pr., 6 qtrs. of MUA 181. Individual instruction in instrumental or vocal areas. Performance and Church majors only. May be repeated.

384. **PERFORMANCE (1).** Pr., 6 qtrs. of MUA 184. Individual instruction in instrumental or vocal areas. For piano pedagogy, theory/composition, bachelor of arts majors, and music education minors. May be repeated.
387. **PERFORMANCE (1).** Pr., 6 qtrs. of MUA 187. Individual instruction in instrumental or vocal areas. For students in elementary and secondary education, and performance minors and electives. May be repeated.
660. **PERFORMANCE (3-3-3).**

The amount of credit in Performance study is based on the following practice schedule:

1 cr. hr. — 5 hours weekly practice.

3 cr. hrs. — 15 hours weekly practice.

Individual instruction Fees Per Course (Per Quarter) . . . \$45.00

This additional fee to be paid at the time of registering for each Performance Course of individual instruction. Instruction is available in one hour or two half-hour lessons per week.

CLASS INSTRUCTION IN PERFORMANCE

The Music Department offers a number of classes in Performance open to Music Majors and Minors and to regularly registered college students who have had previous music training. These classes meet two hours per week and carry one hour credit.

- 101-102-103T. **GUITAR CLASS (1-1-1).** (2-2-2 LEC. AND LAB.). Class instruction and practice in the rudiments of music as applied to the guitar.
- 104-105-106. **PIANO CLASS (1-1-1).** (2-2-2 LEC. AND LAB.). Class instruction and practice in the rudiments of music as applied to piano playing.
- 107-108-109. **VOICE CLASS (1-1-1).** (2-2-2 LEC. AND LAB.). Class instruction and practice in the rudiments of music as applied to voice.
- 110-111-112T. **STRING INSTRUMENTS CLASS (1-1-1).** (2-2-2 LEC. AND LAB.). Class instruction and practice in the rudiments of music as applied to violin, viola, cello and contrabass playing.
- 113-114-115T. **BRASS INSTRUMENTS CLASS (1-1-1).** (2-2-2 LEC. AND LAB.). Class instruction and practice in the rudiments of music as applied to trumpet, trombone and other brass instruments.
- 116-117-118T. **WOODWIND INSTRUMENTS CLASS (1-1-1).** (2-2-2 LEC. AND LAB.). Class instruction and practice in the rudiments of music as applied to clarinet, oboe, bassoon, flute and other woodwind instruments.
- 119T. **PERCUSSION INSTRUMENTS CLASS (1).** (2 LAB.). Class instruction and practice in the rudiments of music as applied to playing the snare drum.
- 120T. **ADVANCED PERCUSSION INSTRUMENTS CLASS (1).** LEC. 2, LAB. Pr., MU 119T or COI. Class instruction and practice in the rudiments of music as applied to playing timpani, the keyboard mallet instruments, and the other miscellaneous percussion instruments.

ADVANCED UNDERGRADUATE AND GRADUATE

- 522-523-524. **THEORY REVIEW (3-3-3).** Pr., senior standing and departmental approval. No credit for Applied, Theory-Composition, or Pedagogy majors. A review of the harmonic techniques of the 18th and 19th centuries, with special emphasis on style and design.

GRADUATE

- 600-601-602. **ADVANCED INSTRUMENTAL AND CHORAL CONDUCTING (2-2-2).** (3-3-3 FOR CHORAL CONDUCTING MAJORS). Laboratory for development of skills relating to the performance of traditional and modern works. Emphasis on score reading and analysis. Participation in an approved instrumental or choral ensemble is required.
603. **BRASS INSTRUMENTS TECHNIQUES (1).** LEC. 1, LAB. 3. Course designed to work out specific problems with graduate students in furthering their knowledge of and skill on brass instruments. Participation in an approved instrumental organization is required. May be repeated for a maximum of 3 hours credit.
604. **WOODWIND INSTRUMENTS TECHNIQUES (1).** LEC. 1, LAB. 3. Course designed to work out specific problems with graduate students in furthering their knowledge of and skill on woodwind instruments. Participation in an approved instrumental organization is required. May be repeated for a maximum of 3 hours credit.
605. **PERCUSSION INSTRUMENTS TECHNIQUES (1).** LEC. 1, LAB. 3. Course designed to work out specific problems with graduate students in furthering their knowledge of and skill on percussion instruments. Participation in an approved instrumental organization required. May be repeated for a maximum of 3 hours credit.
606. **MUSIC IN THE ARTS (4).** Music in relation to architecture, the plastic arts, and poetry.
607. **CHORAL LITERATURE OF THE CLASSIC, ROMANTIC AND MODERN PERIODS (4).** The styles, forms, and performance practices of choral music from the Classic, Romantic and Modern periods, working primarily with scores of representative works. Participation in an approved choral organization is required.
608. **CHORAL ARRANGING (4).** Pr., departmental approval. Advanced Arranging for various choral combinations. Participation in an approved choral organization is required. (May be repeated for a maximum of 8 hours credit for students majoring in choral conducting.)

609. **SEMINAR IN 20TH CENTURY MUSIC (3-3-3).** Pr., departmental approval. Analysis and comparison of representative works of principal composers of the first half of the 20th century. Specific works chosen for each quarter. (May be repeated for a maximum of 9 hrs. credit.)
610. **BAND ARRANGING (4).** Pr., departmental approval. Advanced arranging for various band organizations. Participation in band is required.
611. **ORCHESTRAL ARRANGING (4).** Pr., departmental approval. Advanced arranging for various orchestral organizations. Participation in orchestra is required.
612. **ACOUSTICS IN MUSIC (3).** Pr., departmental approval. The physics of sound as related to music.
613. **DIRECTED INDEPENDENT STUDY (1-4).** Special study in which the student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student at regular intervals.
634. **MUSIC HISTORY SEMINAR (2).** Pr., departmental approval. Different aspects of the history of music. Specific research areas chosen each quarter. May be repeated for a maximum of 6 hrs. credit.
644. **REPERTOIRE SEMINAR (2).** Pr., departmental approval. Music literature in the student's major area through analysis & performance. May be repeated for a maximum of 6 hrs. credit.
- 650-651-652. **TECHNIQUES OF PRIVATE INSTRUMENTAL INSTRUCTION (2-2-2).** Pr., departmental approval. Analysis of teaching and supervised teaching.
- 653-654-655. **TECHNIQUES OF PRIVATE INSTRUCTION IN VOICE (2-2-2).** Analysis of teaching and supervised teaching.
660. **INDEPENDENT STUDY IN PERFORMANCE (3).** Pr., departmental approval. Advanced private study and public performance each quarter. May be repeated for credit not to exceed 12 hours.
670. **INDEPENDENT STUDY IN PERFORMANCE (2).** Pr., departmental approval. Applied private study for graduate students in music education and choral conducting. May be repeated for credit.
- 681-682-683. **INDEPENDENT STUDY IN (A) COMPOSITION, (B) ANALYSIS (2-3, 2-3, 2-3).** Pr., departmental approval.
697. **QUALIFYING RECITAL.**

Naval Science (NS)

111. **INTRODUCTION TO NAVAL SCIENCE (1).** LEC. 2, LAB. 2. Fall. Introduction to basic areas of Naval Science including such subjects as uniforms and insignia, military courtesy, discipline, components and supporting elements of the Navy, logistics, communications, security, Naval Intelligence, and oceanographic research.
- 112-113. **NAVAL SHIPS SYSTEMS I & II (2-2).** LEC. 2, LAB. 2. I Winter, II Spring. Principles of ship design, construction and stability. Study of impaired stability and damage control. Shipboard auxiliary systems, basic electricity, introduction to thermodynamics and steam cycle as applied to Naval propulsion systems. Advanced propulsion and ship design including nuclear and gas turbine engines.
- 211-212. **NAVAL WEAPONS I & II (2-2).** LEC. 3, LAB. 2. I Fall, II Winter. Introduction to weapons systems through a study of fundamental principles of sensor, tracking, computational, and weapons delivery subsystems, in addition to the practical application of various systems.
213. **SEAPOWERS AND MARITIME AFFAIRS (2).** LEC. 3, LAB. 2. Spring. A seminar course dealing with broad principles, concepts, and elements of seapower and maritime affairs with application to the United States and other world powers.
- 311-312. **NAVIGATION I & II (3-3).** LEC. 4, LAB. 2. I Fall, II Winter. The theory and principles of piloting involving the use of visual and electronic aids. The theory, principles, and procedures of celestial navigation.
313. **NAVAL OPERATIONS (3).** LEC. 4, LAB. 2. Spring. Navy tactical formations and dispositions, relative motion, Rules of the Road, maneuvering board, and communications.
- 321-322-323. **EVOLUTION OF WARFARE (3-3-3).** LEC. 3, LAB. 2. Fall, Winter, Spring. Forms of warfare practices to identify historical continuity and change in the evolution of warfare. Demonstrates concepts of strategy, examines great captains and military organizations of history to discover ingredients of their success. Explores the impact of historical precedent, economic factors, and technological change on politico-military thought and action.
- 411-412-413. **PRINCIPLES OF NAVAL ORGANIZATION LEADERSHIP AND MANAGEMENT, (3-3-3).** LEC. 3, LAB. 2. Fall, Winter, Spring. Various tools and methods of leadership. The Uniform Code of Military Justice from the division officer's perspective. Naval personnel administration, material management, and correspondence.
- 421-422-423. **AMPHIBIOUS WARFARE (3-3-3).** LEC. 3, LAB. 2. Fall, Winter, Spring. Amphibious warfare prior to WW II through Grenada; definitions of concept, examination of doctrinal origins, evolution of amphibious warfare and tactics and techniques, and the current structure of the Fleet Marine Force and its equipment.

Nursing (NUR)

101. **ORIENTATION TO NURSING (1).** Fall. An introduction to the discipline of nursing as a career.
201. **COMPUTER APPLICATIONS IN NURSING (2).** Spring. Prepares student to become beginning users of computer technology as it applies to health care.
301. **FOUNDATIONS OF NURSING (10).** LEC. 5, LAB. 10. Fall. Pr., completion of Pre-Nursing Science Program. Emphasizes the nursing process as the basis of nursing care. Theoretical foundations and skills of the art and science of nursing are presented.
303. **HEALTH ASSESSMENT ACROSS THE LIFE SPAN (4).** LEC. 3, LAB. 2. Fall. Pr., completion of Pre-Nursing Science Program. Designed to prepare students to perform comprehensive health assessment across the life span.

311. **NURSING CONCEPTS I (12).** LEC. 6, LAB. 12. Winter. Pr., NUR 301, 303. The use of the nursing process for effecting a therapeutic relationship with clients experiencing chronic health stressors is presented.
312. **NURSING CONCEPTS II (12).** LEC. 6, LAB. 12. Spring. Pr., NUR 311. Emphasis is placed on the essential life functions affecting the adaptation of clients to acute stressors.
315. **FAMILY STRESSORS (4).** Spring. Pr., NUR 311. Family development and adaptation to stressors inherent in life experiences is explored.
321. **NURSING CARE OF THE CHILDBEARING FAMILY (9).** LEC. 4, LAB. 10. Summer Pr., NUR 312, 315. Nursing care for the childbearing family throughout the health illness continuum is presented.
331. **CHILD HEALTH NURSING (9).** LEC. 4, LAB. 10. Summer. Pr., NUR 312, 315. Explores the adaptive responses of children to stressors affecting health status. Student functions as care-giver and advocate for children in a variety of health care settings.
396. **HUMAN SEXUALITY IN HEALTH AND ILLNESS (3).** Pr., junior standing, open to all University students. Explores human sexuality in relation to health-illness continuum. Opportunity to view sexuality across the life span.
401. **TRANSITION INTO PROFESSIONAL NURSING (3).** Pr., admission to professional curriculum. For registered nurse students only. Designed to facilitate the transition from diploma/associate nursing to professional practice.
412. **PSYCHIATRIC/MENTAL HEALTH NURSING (7).** LEC. 3, LAB. 8. Fall. Pr., NUR 321, 331. Emphasizes nursing interventions to facilitate successful psychosocial adaptations for individuals and groups. Stressors that result in psychosocial impairments are examined.
420. **PRINCIPLES OF EPIDEMIOLOGY AND DISEASE SURVEILLANCE (4).** The course consists of study of the concepts, principles, and methods generally useful in surveillance and investigation of communicable disease in hospitals and communities.
422. **COMMUNITY HEALTH NURSING (7).** LEC. 3, LAB. 8. Fall. Pr., NUR 321, 331. Nursing process is used to facilitate individuals and groups in primary health setting to maintain, attain, or regain optimal health status.
432. **NURSING RESEARCH (4).** LEC. 4. Fall. Pr., NUR 311, 312, 321, 331. Explores the research process as a systematic means for contributing to nursing knowledge is provided. Emphasis is on the use of research knowledge to assist clients in adapting to various stressors.
443. **GERONTOLOGICAL NURSING (4).** LEC. 2, LAB. 4. Winter. Pr., NUR 412, 422, 432. Students are introduced to the long-term care spectrum and issues of care provision for the older adult in community and institutional settings.
450. **SENIOR SEMINAR (3).** Winter. Pr., NUR 412, 422, 432. Role socialization essential for entry to the practice of professional nursing is explored. Stressors in professional practice are considered.
460. **SPECIAL TOPICS IN CLINICAL NURSING (7).** LEC. 2, LAB. 10. Pr., 300-level NUR required courses. Designed to provide indepth exploration of a student selected clinical area. Focus is on the clinical role and responsibility of professional nursing in selected specialty areas.
471. **HONORS THESIS (1-6).** Open to persons in the University Honors Program and with consent of the student's Honors adviser.
490. **DIRECTED INDEPENDENT STUDY (1-6).** Pr., NUR 301. May be repeated to a maximum of 6 hrs. credit. Directed readings and/or clinical study in student-selected areas related to nursing.
495. **MANAGEMENT IN NURSING (5).** Spring. Pr., NUR 443, 450. The leadership component of the professional nursing role is discussed. Management and leadership theories are presented for assimilation into practice.
499. **PRECEPTORSHIP (13).** LEC. 1, LAB. 20. Spring. Pr., NUR 450. Students are provided the opportunity to synthesize concepts and skills in a student-selected clinical setting. This is facilitated through a selected role model serving as preceptor.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **PATHOPHYSIOLOGY OF POTENTIALLY HANDICAPPING CONDITIONS IN YOUNG CHILDREN (3).** Credit for this course not accepted as credit for NUR 331. Designed for students pursuing careers in health related fields or other professions that provide services to handicapped children. Handicapping conditions of infants, their treatment, and implications are explored.

Nutrition (NN)

(Interdepartmental Graduate Program)

651. **NUTRITION I. THE MACRO NUTRIENTS (5).** Pr., ADS 619, CH 519, ZY 524. The interrelationships among the energy-furnishing and structural nutrients, including carbohydrates, lipids, and proteins. The digestion, absorption, transport, and metabolism of these nutrients.
652. **NUTRITION II. THE MICRO NUTRIENTS (5).** A continuation of NN 651 with emphasis on the role of vitamins and minerals. A study of the interrelationships of nutrients and hormones. Effects of excesses and deficiencies on the organism.
653. **NUTRITION III. ASSESSMENT OF NORMAL AND ABNORMAL NUTRITIONAL STATES (5).** A continuation of NN 652, with emphasis on assessment of nutritional status of man and animals including an evaluation of standards, the human nutrition survey, clinical problems in nutrition, and hereditary and other disorders in metabolism.
654. **EXPERIMENTAL NUTRITION (5).** LEC. 2, LAB. 6. Pr., ADS-CH 519 and BY 501. Acquaints the student with the animal feeding experiment as a basis for research in nutrition. Includes balance studies and proximate analysis.
655. **NUTRITION SEMINAR (1).** Required of all students in the interdepartmental program in Nutrition. Must be taken three quarters.

656. **DIRECTED READINGS IN NUTRITION (3-5).** The development of nutrition as a science and a critical analysis of the classic and current literature in nutrition.
699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)**
799. **DOCTORAL RESEARCH AND DISSERTATION. (CREDIT TO BE ARRANGED.)**

Suggested courses offered in other departments: (For related courses at 500 level, see departmental listing.)

- ADS 618. **BIOCHEMISTRY**
- ADS 619. **BIOCHEMISTRY**
- ADS 625. **ADVANCED MONOGASTRIC NUTRITION.**
- ADS 627. **ADVANCED RUMINANT NUTRITION.**
- ADS 645. **BIOCHEMICAL RESEARCH TECHNIQUES.**
- ADS 720. **MINERAL METABOLISM.**
- ADS 721. **ENERGY METABOLISM.**
- ADS 722. **PROTEIN METABOLISM.**
- ADS 723. **VITAMINS.**
- ADS 741. **PROTEINS.**
- ADS 742. **LIPIDS.**
- ADS 743. **ENZYMES.**
- BST 601. **BIOLOGICAL STATISTICS II.**
- FAA 621. **FISH NUTRITION.**
- NF 624. **ADVANCED HUMAN NUTRITION I.**
- NF 625. **ADVANCED HUMAN NUTRITION II.**
- NF 626. **ADVANCED HUMAN NUTRITION III.**
- PH 610. **ADVANCED POULTRY NUTRITION.**
- VPH 601. **MEDICAL PHYSIOLOGY I.**
- VPH 602. **MEDICAL PHYSIOLOGY II.**
- VPH 638. **PHYSIOLOGY OF DIGESTION.**

Nutrition and Foods (NF)

Professors Lane and Winterfeldt, *Acting Head*

Associate Professors Clark, Crayton, Keith, and Struempfer

Assistant Professors Craig-Schmidt, Fellers, Gropper, Mikel, Olds, and Svacha

Instructors Dillard and Strawn

101. **PRINCIPLES OF HOSPITALITY MANAGEMENT (3).** Introduction to the business of tourism as related to lodging, recreational facilities, and restaurants.
200. **NUTRITION AND HEALTH (3).** Principles of human nutrition and food choices related to the health of individuals.
201. **INTRODUCTORY FOOD SCIENCE & TECHNOLOGY (3).** **LEC. 2, LAB. 2.** Principles of major food processing methods, concepts of food quality, nutrition, sanitation, safety of food additives, and food laws. Overview of careers in food science and food technology. (Same course as FS 201.)
202. **PRINCIPLES OF FOOD PREPARATION (5).** **LEC. 3, LAB. 4.** Pr., CH 103 or BI 105. Basic chemical and biological principles underlying the fundamental processes and standards of food preparation.
204. **FOOD MANAGEMENT FOR THE CONSUMER (5).** **LEC. 4, LAB. 3.** Pr., NF 200 and 202. Management of individual and family resources in the selection of food. Emphasis placed on food patterns, nutritional needs, cost control, time and energy conservation and the food marketing system.
206. **FOOD AND HEALTH. (3).** **LEC. 2, LAB. 3.** Selection and preparation of basic foods with an introduction to meal planning to meet daily nutritional needs and time-money budgetary constraints. Not open to majors in Nutrition and Foods (CDP, NF, HRM) or Vocational Home Economics.
304. **QUANTITY FOOD PREPARATION (5).** **LEC. 3, LAB. 4.** Pr., junior standing and NF 204. Menu planning, preparation and sanitation in institutional service of food. Includes use, operation, and maintenance of equipment. Laboratory experience in university food service facilities. Credit will not be given for both NF 304 and NF 316.
307. **SURVEY OF DIETETICS (2).** **LEC. 1, CLINICAL EXPERIENCE 3.** Role and professional conduct of dietitians in various institutions. Open to students in the Coordinated Dietetics Program and Nutrition and Foods majors (junior standing) with COI.

312. **CHILD NUTRITION (3).** LEC. 2, LAB. 2. Pr., NF 200. Application of nutrition in the development of the child from conception through adolescence.
316. **FOOD SERVICE: PLANNING, PRODUCTION, AND MANAGEMENT (10).** LEC. 5. **CLINICAL EXPERIENCE 15.** Pr., junior standing and NF 204. Principles of menu planning, preparation, and sanitation in institution food service. Use, operation and maintenance of food service equipment. Experience in cooperating facilities. Open only to students enrolled in the Coordinated Dietetics Program.
318. **NUTRITIONAL BIOCHEMISTRY (5).** LEC. 4, LAB. 3. Pr., CH 203. Chemistry of carbohydrates, fats, proteins, vitamins, and minerals applied to human nutrition.
324. **FOOD PRESERVATION (3).** LEC. 2, LAB. 3. Pr., NF 202, MB 300, or COL. Food spoilage mechanisms and their prevention.
346. **FOOD SERVICE ORGANIZATION AND MANAGEMENT (5).** Pr., NF 204, 304, MN 310. Management principles, methods of control and personnel management related to quantity food service operations.
- 346L. **FOOD SERVICE ORGANIZATION AND MANAGEMENT PRACTICUM (1).** LAB. 3. Pr., NF 304, MN 310. Taken concurrently with NF 346. Utilizes the concepts and principles of management that relate to institutional food organization and management.
358. **COMMUNITY AND FAMILY HEALTH (3).** LEC. 2, LAB. 2. Facilities, services, and agencies within the community which affect health. Field trips.
362. **PROBLEMS IN COMMUNITY NUTRITION (3).** Pr., NF 200 or equivalent. Environmental factors that influence the nutritional level of people.
372. **FUNDAMENTALS OF NUTRITION (3).** Pr., CH 203, BI 101. Principles of human nutrition and factors influencing nutrient requirements.
382. **PRINCIPLES OF NORMAL NUTRITION I (5).** LEC. 3, LAB. 4. Pr., NF 318 or equivalent. Physiological and biochemical bases of nutrient needs of the healthy individual. Methods of assessing nutritional adequacy of the diet.
392. **PRINCIPLES OF NORMAL NUTRITION II (5).** LEC. 3, LAB. 4. Pr., NF 382. Continuation of NF 382.
408. **INDEPENDENT OR FIELD STUDY (3-8).** Laboratory or field experiences approved and supervised by a faculty member. May be repeated for a maximum of 8 credit hours.
422. **COMMUNITY NUTRITION (10).** LEC. 5, **CLINICAL EXPERIENCE 15.** Pr., NF 392. Assessment of community nutritional status and methods used to effect change. Experience in cooperating facilities. Open only to students enrolled in the Coordinated Dietetics Program.
432. **MEDICAL DIETETICS (10).** LEC. 5, **CLINICAL EXPERIENCE 15.** Pr., NF 392. Principles of nutrition related to disease. Open only to students enrolled in Coordinated Dietetics Program. Experiences in cooperating institutions.
442. **ADVANCED MEDICAL DIETETICS (10).** LEC. 3, **CLINICAL EXPERIENCE 21.** Pr., NF 432. Emphasis on current research in dietetics and its clinical application. Experience in cooperating facilities. Open only to students in the Coordinated Dietetics Program.
446. **CATERING (3).** LEC. 2, LAB. 3. Pr., NF 304. Types of catered food service functions; planning, pricing, organization, management, equipment, and service.
450. **HOTEL MANAGEMENT (4).** Pr., NF 101, MN 310. The management of the rooms division, food and beverage departments, and other profit centers. Includes computer applications.
456. **ADMINISTRATIVE DIETETICS PRACTICUM (12).** **CLINICAL EXPERIENCE 36.** Pr., NF 204, 316, 346, 422, 442. The processes of planning, organizing, directing, evaluating, and controlling, applied to the administration of food service systems, medical dietetics programs, and community nutrition programs. Experiences in cooperating facilities. Open only to students enrolled in the Coordinated Dietetics Program.

ADVANCED UNDERGRADUATE AND GRADUATE

502. **DIET THERAPY (5).** LEC. 4, LAB. 2. Pr., NF 392. Application of principles of nutrition to various periods of stress and as a therapeutic aid in treatment of disease.
504. **ADVANCED INSTITUTIONAL FOOD AND RESTAURANT MANAGEMENT (2).** LEC. 2. Pr., NF 346, 346L. Studies of the functional units and interrelationships in an institutional and restaurant food service.
524. **PROFESSIONAL INTERNSHIP IN INSTITUTIONAL FOOD AND RESTAURANT MANAGEMENT (10-12).** LAB. 30. Pr., NF 504. Applications of management principles in institutional food service or restaurant facilities.
562. **NUTRITION AND PHYSICAL PERFORMANCE (4).** Pr., ZY 251, NF 318 or equivalent, and junior standing. The effects of nutrition on human physical performance and athletic ability.
564. **EXPERIMENTAL FOODS (5).** LEC. 2, LAB. 6. Pr., NF 202, CH 203, or COL. Effects of variation of ingredients and treatments on quality characteristics of foods.
572. **NUTRITION AND SOCIETY (5).** Pr., satisfactory course in nutrition and COL. Environmental practices that exist in a modern society. Credit will not be given for both NF 422 and NF 572.
578. **MODERN VIEWS OF NUTRITION (3).** Pr., satisfactory course in nutrition. Current concepts in nutrition and related fields.
582. **TEACHING NUTRITION TO CHILDREN IN SCHOOLS (3).** Pr., one nutrition course and junior standing. Methods for teaching nutrition principles and motivating changes in food habit of students in grades K-12. Focuses on nutrition education research as well as specific activities and objectives for various age groups.
588. **INTERNATIONAL NUTRITION (3).** Pr., satisfactory course in nutrition; Nutritional status of world population and local, national, and international programs for improvement.

592. **NUTRITION IN THE LIFE CYCLE (5).** Pr., NF 392 and junior standing. Metabolic and clinical approach to nutrition throughout the life cycle with emphasis on groups for whom nutrition is more crucial.

GRADUATE

601. **SEMINAR IN NUTRITION AND FOODS (1).** Each quarter. Attendance required every quarter. Students must include two credits in Plan of Study. A maximum of two credits may be counted toward graduation.
605. **METHODS OF RESEARCH IN HUMAN SCIENCES (3).** Research and investigation methods applicable to the various areas of Human Sciences. Required of all graduate students in Nutrition and Foods.
609. **SPECIAL PROBLEMS IN NUTRITION AND/OR FOODS. (2-5).** Pr., COI. May be taken more than one quarter.
620. **ADVANCED FOODS I (5).** Pr., NF 564 or equivalent and COI. Food quality assessment and chemistry of carbohydrates in foods.
621. **ADVANCED FOODS II (5).** Pr., NF 564 or equivalent and COI. Chemistry of fats and proteins in foods.
622. **PROBLEMS IN FOOD PRESERVATION (5).** Pr., BY 300. Various problems which grow out of advanced study of preservation of foods. These problems are subjects for minor research.
623. **READINGS IN NUTRITION AND/OR FOODS (5-10).** Pr., NF 382, CH 203. A critical survey of current literature. May be taken more than one quarter.
624. **ADVANCED HUMAN NUTRITION I (5).** Pr., NF 392 or equivalent. Carbohydrates, fats and proteins. Consideration will be given to the biochemical and physiological functions of these nutrients and their interrelationships in human nutrition.
625. **ADVANCED HUMAN NUTRITION II (5).** Pr., NF 392 or equivalent. Vitamins and minerals. Consideration will be given to the biochemical and physiological functions and interrelationships of these nutrients in human nutrition.
626. **ADVANCED HUMAN NUTRITION III (5).** Pr., NF 624 and 625, or equivalents. Assessment of human nutritional status. Dietary, biochemical and clinical methods of appraisal, and programs for improvement of status.
628. **RESEARCH METHODS IN NUTRITION (5).** A course designed to acquaint graduate students with modern laboratory techniques used in Human Nutrition Research.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** Required of all students under the Thesis Option in any field.

Pharmaceutical Sciences (PY)

Professors Riley, Head, Clark, Coker, Darling, Doorenbos, Hamrick, Ravis, and Wilken
Associate Professor Parsons
Assistant Professors DeRuiter and Smith

301. **PHARMACEUTICS I (4).** LEC. 4. Coreq., PY 301L. Physical-chemical principles are applied to develop an understanding of solid dosage forms and homogeneous liquid dosage forms. Selected official preparations are considered from this viewpoint.
- 301L. **PHARMACEUTICS I LABORATORY (1).** LAB. 3. Coreq., PY 301. Application of principles and techniques to preparation and usage of solid dosage forms including powders, tablets, capsules, and prolonged release types.
302. **PHARMACEUTICS II (4).** LEC. 4. Pr., PY 301, 301L. Coreq., PY 302L. A continuation of PY 301 dealing with heterogeneous and plastic systems and the physical and chemical principles applicable to plastic and polyphasic dosage forms including suspensions, colloids, mixtures, ointments, creams, emulsions and lotions.
- 302L. **PHARMACEUTICS II LABORATORY (1).** LAB. 3. Pr., PY 301, PY 301L. Coreq., PY 302. Application of principles and techniques to preparation and usage of liquid, heterogeneous and plastic dosage forms including solutions, syrups, elixirs, suspensions, emulsions, ointments, creams and lotions.
316. **MODERN METHODS OF DRUG ANALYSIS (4).** LEC. 3, LAB. 3. Pr., CH 301. Theory and application of physical and chemical methods with special emphasis on the use of chromatography, instrumentation, and nonaqueous systems in the analysis of pharmaceutical products.
401. **PHARMACEUTICS III (4).** LEC. 4. Pr., PY 302, 302L. Coreq., 401L. Influence of formulation on the therapeutic activity of a drug in a dosage form, emphasizing effects of dosage forms on biological response, physiological factors which may affect the drug contained in the dosage form and the dosage form of the drug itself.
- 401L. **PHARMACEUTICS III LABORATORY (1).** LAB. 4. Pr. or Coreq., PY 401. Laboratory exercises to demonstrate dosage form and physiologic influence on drug bioavailability and disposition.
403. **PHARMACEUTICS IV (2).** LEC. 2. Pr., PY 401, 401L. An introduction to the prescription, its interpretation, handling, compounding and dispensing together with pertinent calculations and techniques.
- 403L. **PHARMACEUTICS IV LAB. (1).** LAB. 3. Coreq., PY 403. A laboratory in which compounding and dispensing of prescriptions and proprietaries are practiced.
420. **MEDICINAL CHEMISTRY I (5).** Pr., CH 302, PY 316, ZY 561; Coreq., PY 531. Relationship of physicochemical properties to the pharmacological actions of therapeutic agents. The mechanism of action, classification and structure-activity relationships of drugs in terms of their physical and chemical properties.
421. **MEDICINAL CHEMISTRY II (4).** Pr., PY 420, 531; Coreq., PY 432, 532. A continuation of PY 420.
422. **MEDICINAL CHEMISTRY III (5).** Pr., PY 421, 532; Coreq., PY 433, 533. A continuation of PY 421.

423. **SURVEY OF MEDICINAL CHEMISTRY (5).** Pr., CH 305 or COI. Credit in PY 420, 421 or 422 precludes credit for this course. A survey of the molecular action of drugs which emphasizes the relationships of physico chemical and structural properties of organic compounds to their pharmacologic activity.
432. **CHEMICAL PHARMACOLOGY LABORATORY (1), LAB. 3.** Pr., PY 420, 531, Coreq., PY 421 and 532. Laboratory exercises to demonstrate drug action, mechanism, and structure-activity relationship.
433. **CHEMICAL PHARMACOLOGY LABORATORY (1), LAB. 3.** Pr., 421, 532, Coreq., PY 422 and 533. Continuation of PY 432.
434. **NUCLEAR PHARMACY (3), LEC. 3.** Pr., PY 532. Use of radioisotopic material in the diagnosis and treatment of disease, including the nature of radiation and its interaction with biological material, measurement of radioactivity, preparation of dosage forms, safe handling of isotopes and legal requirements of radiopharmacy.
- 434L. **NUCLEAR PHARMACY LAB. (1), LAB. 3.** Pr., or Coreq. PY 434. A laboratory experience designed to meet certification requirements in Nuclear Pharmacy. Includes experiments in the characteristics of ionizing radiation, instrumentation, dosimetry, and dose preparations using the molybdenum-technetium generator and kits.
436. **CANCER CHEMOTHERAPY (3), LEC. 3.** Pr., PY 533, COI. Consideration of theoretical and practical aspects of drug use in therapy of neoplasms.
444. **HYPERTENSION SCREENING AND EDUCATION (1).** Pr., PC 448. A comprehensive review of the etiology, pathology, and pharmacotherapeutics of hypertension. Participation in community screening and education experiences is required.
445. **DIABETES (1).** Pr., 4 PY standing. Physiology, pathology, and treatment of diabetes. Monitoring techniques of home therapy.
495. **SPECIAL PROBLEMS (1-3).** Pr., COI; may be repeated for a maximum of 8 credit hours.
502. **PHARMACOKINETICS (3), LEC. 3.** Pr., PY 401, PC 448. Characterization of the time course of drug absorption, distribution, metabolism, and excretion and the relationship of these processes to the intensity and time course of therapeutic and adverse effects of drugs.
510. **ADVANCED PHARMACEUTICS (3).** Pr., PY 401. Includes the basic physio-chemical and kinetic aspects which underlie the makeup and subsequent action of pharmaceutical dosage forms.
511. **ELEMENTS OF PHARMACEUTICAL MANUFACTURING (2), LEC. 2.** Pr., PY 302, 302L. Manufacturing procedures, operation and principles. In the laboratory selected pilot scale production problems are carried out to completion including control and testing of finished products.
- 511L. **PHARMACEUTICAL MANUFACTURING LAB. (3), LAB. 9.** Coreq., PY 511. Pilot scale production including control, evaluation, and testing of finished products.
512. **INTRAVENOUS ADMIXTURES AND STERILE PREPARATIONS (3), LEC. 1.** Pr., PY 302, Coreq., PY 512L. Principles involved in the preparation of IV admixtures, total parenteral nutrition, and sterile dosage forms in hospitals, clinics, and professional pharmacies.
- 512L. **INTRAVENOUS ADMIXTURES AND STERILE PREPARATIONS LABORATORY (1), LAB. 3.** Coreq., PY 512. Sterilization procedures, IV service techniques and total parenteral nutrition preparations are studied including the necessary calculations and equipment.
531. **PHARMACOLOGY I (5).** Pr., PC 346, 347 Coreq., PY 420. Biochemical and physiological effects, action mechanism, absorption, distribution, biotransformation, excretion, and therapeutic and other uses of drugs.
532. **PHARMACOLOGY II (5), LEC. 5.** Pr., PY 420, 531; Coreq., PY 421, 432. Continuation of PY 531.
533. **PHARMACOLOGY III (4), LEC. 4.** Pr., PY 421, 532; Coreq., PY 422, 433. Continuation of PY 532.
534. **TOXICOLOGY LABORATORY (1), LAB. 3.** Pr., ZY 561, PY 531 or COI, Coreq. PY 535. Exercises in acute and chronic toxicity, isolation, identification and analysis of metals, organic acids and bases from biological specimens.
535. **TOXICOLOGY (5).** Pr., PY 533. The basic science of poisons including the acute and chronic toxicology of common environmental, agricultural, industrial, commercial, medicinal and natural products.
536. **CELLULAR PHARMACOLOGY (5).** Pr., ZY 561, CH 302. Cytological basis of pharmacodynamics including metabolic energy transformation, protein synthesis, and cellular control systems as related to drug actions.
537. **FUNDAMENTALS OF BIONUCLEONICS (3), LEC. 2, LAB. 3.** Pr., PS 206, COI and second professional year standing. Theoretical and practical application of trace level radioactivity for research application to pharmacy and allied sciences.
538. **PHARMACEUTICAL METHODOLOGIES (5), LEC. 2, LAB. 9.** Pr., CH 302, ZY 561. Principles and techniques used in research in the basic pharmaceutical sciences.

GRADUATE

601. **PARENTERAL PREPARATIONS (5), LEC. 3, LAB. 6.** Pr., PY 401 and COI. Theory, preparation and testing of various medicinal preparations intended for injection into the body. Pharmaceutical principles are applied to problems of filtration, sterilization, isotonicity, hydrogen ion concentration and aseptic techniques.
602. **TABLET MANUFACTURE (5), LEC. 2, LAB. 9.** Pr., PY 401. Essentials in the manufacture, coating and evaluation of compressed tablets.
603. **PRODUCT DEVELOPMENT (5), LEC. 3, LAB. 6.** Pr., PY 401. Formulation, evaluation and control techniques as well as actual manufacture of products of pharmaceutical and cosmetic nature.

604. **PHARMCEUTICAL LITERATURE (1).** Literature searching techniques, services, abstracting and writing, designed for the beginning graduate student in the pharmaceutical sciences.
608. **ADVANCED BIOPHARMACEUTICS (5).** LEC. 3, LAB. 6. Pr., COI. The relationship between physical and chemical properties of a drug and its dosage forms and the biological effects elicited following administration together with the relevant pharmacokinetics.
610. **COLLOIDAL AND INTERFACIAL PHENOMENA (5).** LEC. 4, LAB. 3. Pr., CH 508 or equivalent and COI. Interfacial and colloidal phenomena of chemical, biological, and pharmaceutical significance.
611. **STABILITY AND REACTION KINETICS OF PHARMACEUTICALS (5).** Pr., COI. The principles of chemical kinetics as applied to the unique stability problems of the various pharmaceutical dosage forms.
- 620-621-622. **CHEMISTRY OF SYNTHETIC DRUGS (5-5-5).** Pr., PY 422 or COI. Historical background, pertinent literature, organic name reactions, nomenclature, relation of chemical structure and physical properties to biological activity, isosterism, metabolite antagonism, enzyme inhibition, and exhaustive consideration of the chemistry and biological activity of the various therapeutic classes.
- 623-624-625. **SYNTHESIS OF DRUGS (5-5-5).** LEC. 2, LAB. 9. Coreq., PY 620-621-622 or COI. Laboratory procedures in the synthesis of intermediates and representative compounds studied in PY 620-621-622.
- 626-627. **ANALYTICAL AND CONTROL METHODS (5-5).** LEC. 3, LAB. 6. Pr., PY 316 or COI. The principles and techniques of analysis as applied to the various therapeutic classes.
628. **STEROID CHEMISTRY (5).** Pr., PY 620 or COI. Structure, determination, chemistry, synthesis and structure relationships of steroids of pharmacological and pharmaceutical importance.
629. **ALKALOID CHEMISTRY (5).** Pr., PY 620 or COI. Structure determination, chemistry and synthesis of alkaloids with emphasis on the alkaloids of pharmaceutical importance.
630. **FORENSIC AND ANALYTICAL TOXICOLOGY (5).** LEC. 3, LAB. 6. Pr., PY 535, PY 316 or equivalent. The medicolegal aspects of drugs and chemicals commonly encountered by humans and the modern methods used in their separation and identification.
- 631-632. **PSYCHOPHARMACOLOGY (5-5).** LEC. 4, LAB. 3. Pr., PY 536. Effect of neurotropic and psychotropic agents upon reverberatory circuits, chemical transmitters, neural amines, and metabolic energy systems; measures of rate of behavioral change; critique of behavioral screening techniques.
633. **BIOASSAY (5).** LEC. 4, LAB. 3. Pr., MH 267 or an equivalent course in statistics. Statistical basis for design of experiments and analysis of data in pharmacological quantitation.
637. **PHARMACOLOGY SEMINAR (1-3).** May be repeated for a maximum of 3 hrs. credit. Pr., graduate standing.
638. **TOXICOLOGY SEMINAR (1-3).** Pr., graduate standing. Students are expected to present review of current literature and case histories. This will be followed with discussion by students and faculty.
- 650-651. **ADVANCED TOXICOLOGY (5-5).** LEC. 3-3, LAB. 6-6. Pr., PY 535. Toxicological principles, testing procedures, legal requirement, mechanisms of action and treatment of medicinal, environmental and industrial toxicants. (Change in prerequisite and course description.)
660. **HETEROCYCLIC MEDICINAL CHEMISTRY (5).** Pr., COI. The chemical nature and behavior of heterocyclic moieties which are either themselves of medicinal significance or are components possessing therapeutic properties.
680. **GRADUATE SEMINAR (1).** Pr., admission to Graduate School. Required of all pharmacy graduate students each quarter.
681. **DIRECTED READING IN PHARMACAL SCIENCES. (1-5).** Pr., COI and 10 hours of 600-level courses. May be repeated for a maximum of 10 hours.
695. **SPECIAL PROBLEMS (2-5).** Pr., COI. May be repeated for a maximum of 8 hours.
699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)**

Pharmacy Care Systems (PCS)

Professor Barker, Head

Associate Professors Berger, Gibson, Newton, and Pearson

Adjunct Assistant Professors Henry, King, Miller, and Swensson

Adjunct Instructor Felkey

261. **HISTORY AND ORIENTATION (3).** LEC. 3. Pr., PPY or PY standing. Introduction to delivery of health care services with emphasis on the role of the profession of Pharmacy.
265. **DRUGS AND YOUR HEALTH (3).** LEC. 3. Pr., non-pharmacy majors, sophomore standing. Emphasizing rational use of prescription and non-prescription medications. Topics include: how to use licit drugs and chemical substances appropriately; development of drugs; economic factors which impact on health care; drugs and pregnancy, children, and the elderly; and the use of self-help medications for a variety of conditions.
360. **PHARMACY CONVOCATION (0).** Third professional year standing. Professional topics discussed by visiting lecturers, faculty, and students.
361. **DRUG LITERATURE ANALYSIS (3).** LEC. 3. Coreq., ZY 561, CH 302, and PY 302. Evaluation of current therapeutic and drug literature using the scientific method models.
461. **INSTITUTIONAL PHARMACY I (5).** LEC. 5. Pr., PY standing. The development of hospitals, their place in society, importance and place of pharmacy in hospitals and nursing homes. The organization, staffing, services, legal requirements, development of institutional pharmacy departments, and interdepartmental relationships to provide comprehensive pharmacy services.

462. **HOSPITAL PHARMACY LABORATORY (1).** LAB. 3. Pr., PY 401 and COI. Course may be repeated for a maximum of three credit hours. Hospital pharmacy experience is obtained in the environment of participating hospitals. Students are expected to furnish transportation for this elective course.
464. **PHARMACY JURISPRUDENCE (5).** Pr., PCS 361. Basic legal and ethical principles of pharmaceutical patient care and their effect on the patient drug use process.
465. **PHARMACY OPERATING SYSTEMS (5).** LEC. 3, LAB. 6. Pr., PCS 261. Methods of systems and decision analysis applied to problems of optimizing the use of money, equipment, drug products, information and personnel within community and institutional environments.
466. **ENVIRONMENT OF DRUG DELIVERY (3).** Pr., PCS 261. Basic political, legal, social, ethical and economic principles of delivering the drug component of health care to patients.
470. **CLINICAL DRUG TRIALS (3).** LEC. 3. Pr., PCS 361, 473. The design, planning, and execution of protocols for Phase I, II, and III clinical drug trials, including the relative merits of prospective and retrospective methodologies for various disease states.
471. **PROFESSIONAL COMMUNICATIONS I (3).** LEC. 2, LAB. 3. Pr., PY standing. The nature, purpose and process of communication for the Health Professional. Interviewing, detailing, advertising, and patient counseling are covered along with patient education and information dissemination.
472. **PROFESSIONAL COMMUNICATIONS II (3).** LEC. 2, LAB. 3. Pr., PCS 471. Continuation of PCS 471.
473. **CLINICAL BIostatISTICS (3).** LEC. 3. Pr., PCS 361. Biostatistical analysis of clinical data including data collection protocols; psychological and biophysical medical assessment; descriptive and inferential statistics.
495. **SPECIAL PROBLEMS (1-3).** Pr., COI. Individualized investigation of pharmacy care systems problems as related to the delivery of health care services.
509. **INSTITUTIONAL PHARMACY II (5).** LEC. 4, LAB. 3. Pr., PC 448, PCS 461, and COI. Comprehensive presentation of the development, responsibilities, classification, organization and administration of the pharmacy in hospitals, nursing homes, etc., from the viewpoint of the administrative pharmacist. Provides a survey of the responsibilities of the director of pharmacy service in a hospital.
562. **INTRODUCTION TO MEDICATION INFORMATION SYSTEMS (3).** LEC. 2, LAB. 3. Pr., MN 207 and junior standing. Introduction to the design, control and planning of electronic information systems used to implement medication orders and manage the medication distribution system. Five concepts are emphasized.
563. **PUBLIC HEALTH (5).** LEC. 4, LAB. 3. Pr., BY 302, PCS 361 or equivalent. Epidemiological study of diseases of man. A survey of the public health and preventive medicinal programs of federal, state, local and private agencies is included.
564. **DRUG DISTRIBUTION SYSTEMS (5).** LEC. 4, LAB. 3. Pr., PCS 562, PCS 465, PCS 464. Application of the principles of cybernetics to drug distribution systems in hospitals, nursing homes, and other inpatient facilities.

GRADUATE

680. **GRADUATE SEMINAR (1).** Pr., admission to Graduate School. Required of all pharmacy graduate students each quarter.
681. **HOSPITAL PHARMACY ADMINISTRATION (3).** Pr., PCS 461 or COI. Administrative and policymaking procedures regarding hospital economics, planning, staffing, communications, directing, controlling, design of facilities and operations. Provides an understanding of the socio-economic aspects of hospital pharmacy practice and competence in selected administrative skills needed by administrative pharmacists.
682. **RESEARCH METHODS AND DESIGN IN HEALTH SCIENCE I (3).** Pr., BY 501 or equivalent or COI. Description and application of the scientific methods to research problems unique to the health care field, including problem formulation, operational definitions, hypotheses, validity, reliability, research design, data collection by observation, questionnaires, and interviews; cost effectiveness analysis, clinical drug investigations, critiquing research.
683. **RESEARCH METHODS AND DESIGN IN HEALTH SCIENCES II (3).** Pr., PCS 682. Design and analysis of research problems in the health care field. The role of operational definitions, concept and construct linkage, hypotheses, and control in causal or covarying designs.
684. **MEDICATION INFORMATION SYSTEMS (3).** Pr., PCS 465 or COI. Design, control, and planning of information systems used to implement medication orders and manage the medication distribution system.
695. **SPECIAL PROBLEMS (2-5).** Pr., COI; may be repeated for a maximum of 8 credit hours.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**

Pharmacy Practice, Clinical (PC)

Associate Professors Campagna, Head, Alexander, Beck, Janer, Lazarus, Tanja, and Thomasson

Assistant Professors Farringer, Guenther, McMillan and Reinke

Adjunct Professor Boshell

Adjunct Associate Professor R. Davis

Adjunct Assistant Professors Bowman, Breland, Como, Diamond, Fisher, Geerts, Griffies, Hendrix, Krinsky, Lockwood, Markiewicz, Martin, Moore, Morgan, Norman, Parker, Payne, Pittman, M. Short, Taylor, and Thompson

Adjunct Instructors Alverson, Ball, Barr, Batt, Brandon, Beasley, Bledsoe, Breaux, Brooklere, C. Brown, J. Brown, Burckhart, Clark, Cooper, Davis, Deloach, Dykes, Easter, Epp, Forde, Galtney, Godfrey, Hartenstein, Henderson, Hinkle, Holley, Johnston, Jones, Josof, Knight, Knowlton, B. Main, T. Main, McLemore, Morris, H. Nelson, J. Nelson, Nix, Peoples, Phillips, Redden, Sanchez, Sandlin, C. Scarborough, J. Scarborough, Schenk, Seale, B. Short, Shoff, J. Silvey, L. Silvey, Simonson, Smith, Stamitoles, Stephenson, B. Street, M. Turner, P. Turner, Walls, Weeks, Whitehead, Woodward, and Vinson

346. **CLINICAL EVALUATION OF DRUG THERAPY (3).** LEC. 3. Pr., CH 302, ZY 561, Coreq., PC 347. Examination of the use and interpretation of clinical laboratory test procedures as applied to monitoring therapy.
347. **HUMAN PATHOLOGY (5).** LEC. 5. Pr., ZY 561, CH 302, Coreq., PC 346. The general mechanisms and language of disease. Special emphasis on pathogenesis of disease to include an understanding of the dynamic nature of disease.
348. **PHARMACEUTICAL TERMINOLOGY (2).** LEC. 2. Pr., first professional year standing. Common terms and abbreviations used in the professional and scientific aspects of pharmacy and medicine.
447. **THERAPY OF DISEASE I (3).** LEC. 3. Pr., PY 420, 531, Coreq., PY 421, 532. The combination of pathophysiology, clinical chemistry, pharmacology, biopharmaceutics, etc., for specific diseases. To be presented through use of actual case studies with emphasis on the role of the pharmacist in treatment of patient.
448. **THERAPY OF DISEASE II (3).** LEC. 3. Pr., PC 447, Coreq., PY 422, 533. Continuation of PC 447.
449. **DRUG THERAPY IN CLINICAL PRACTICE (5).** LEC. 3. **CLINICAL CONFERENCE 1, LAB. 6.** Pr., PC 448, PY 533. A clinical clerkship involving the observation of drug effects in patients. Students monitor and evaluate drug action by participating in patient rounds and clinical conferences.
450. **AUTOTHERAPY (3).** LEC. 3. Pr., PC 448, PY 422, 533. Introduction to the triage function of the pharmacist. Evaluation of and response to patient illness complaints.
452. **DRUG INFORMATION ORIENTATION (2).** LEC. 2. Pr., PC 346, 347. Evaluation, assimilation, and dissemination of drug information.
453. **PROFESSIONAL PRACTICE (3).** LEC. 1, LAB. 6. Pr., 3rd prof. year standing. COI. Placement of students in various pharmacy practice environments to increase knowledge of practice options.
454. **CARDIOPULMONARY LIFE SUPPORT (1).** Pr., PC 448. The techniques used to administer basic life support to adults, children, and infants. The devices and drug therapy used in advanced cardiac life support.
455. **VENEREAL DISEASE EDUCATION AND CONTRACEPTION (1).** Pr., PC 448. The epidemiology, modes of transmission, prevention, diagnosis, and treatment of venereal diseases. The proper use, effectiveness, adverse effects and contraindications of contraceptive methods.
456. **DRUG ABUSE/POISON PREVENTION EDUCATION (1).** Pr., PC 448. Drugs and chemical substances used for non-therapeutic purposes and specific treatment modalities for intoxications.
457. **DRUG INTERACTIONS (3).** LEC. 3. Pr., PC 448, PY 422, 533. Mechanisms of drug interactions with other drugs, foods, endogenous materials and modifications of laboratory tests due to drugs.
459. **PRACTICE EXTERNSHIP (15).** LAB. 40. Pr., PY 422, 533, PC 448. A structured externship experience in various practice environments, including hospital, community, and other settings.
461. **INTRODUCTION TO THE CLINICAL ENVIRONMENT (5).** LEC. 1, CONF. 3, LAB. 9. Pr., PC 447, PC 448, and admission to Doctor of Pharmacy degree program. May substitute for PC 449 only for those students opting for the Doctor of Pharmacy program. Introduction to the institutional clinical environment to prepare the student for the responsibilities of the clerkships.
462. **APPLIED PHARMACOKINETICS (3).** LEC. 2, REC. 3. Pr., PY 502 and admission to Doctor of Pharmacy degree program. Clinical application of pharmacokinetics principles. Formulation of pharmacokinetic consultation services for actual patient cases including evaluation of the influences of disease, concurrent drug therapy, and altered organ function or bioavailability, disposition, and elimination of drugs having a narrow therapeutic index.
463. **ADVANCED THERAPEUTICS (6).** LEC. 6. Pr., PC 447, PC 448, and admission to Doctor of Pharmacy degree program. Study of disease states and drug therapy. Emphasis on identification of therapeutic goals and evaluation of effects of drugs on common disease states.

464. **DRUG INFORMATION RETRIEVAL AND ANALYSIS (3).** LEC. 3. Pr., PC 452, PCS 361, and admission to Doctor of Pharmacy degree program. Study of information retrieval, analysis, and communication, Emphasis on identification of literature resources and evaluation of information processing and communication techniques. Practical aspects of providing drug information services.
465. **CLINICAL SEMINAR (1).** LEC. 1. Pr., admission to Doctor of Pharmacy degree program. Coreq., Clerkship sequence. Student presentation of topics in drug therapy.
- 480-481-482. **PHARMACY CLERKSHIP (6-6-6).** LEC. 1, LAB. 39, 3-4 WEEKS. Pr., 459, Coreq., PC 480-481-482. Any quarter by arrangement. Conferences and clinical rotations with training in patient assessment, relational therapy, and drug consultations in various medical, surgical, and family medicine environments.
483. **CLERKSHIP — GENERAL INTERNAL MEDICINE (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Rational pharmacotherapeutics, patient assessment, and communications in internal medicine.
484. **CLERKSHIP — AMBULATORY CARE (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Rational pharmacotherapy, patient assessment, and communications related to medication use in the ambulatory setting.
485. **CLERKSHIP — NEONATOLOGY (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Rational pharmacotherapy, patient assessment, and communications related to medication use in pediatric patients.
486. **CLERKSHIP — PSYCHIATRY (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Rational pharmacotherapy, patient assessment, and communications related to medication use in psychiatric patients.
487. **CLERKSHIP — SURGERY (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. May be taken in lieu of PC 491 or PC 492 with COI. Clinical rotation of five weeks (200 hours). Rational pharmacotherapy, patient assessment, and communications related to medication use in surgical patients.
488. **CLERKSHIP — MEDICINE SPECIALTY (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Rational pharmacotherapy, patient assessment, and communications related to medication use in a specialty area of medicine.
489. **CLERKSHIP — CLINICAL PHARMACOKINETICS (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. May be taken in lieu of PC 492 with COI. Clinical rotation of five weeks (200 hours). Pharmacokinetic analysis of dosage regimens and consultation.
490. **CLERKSHIP — DRUG INFORMATION (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Selection, storage, retrieval, assimilation, evaluation, and dissemination of drug information.
491. **CLERKSHIP — ELECTIVE AREA I (9).** Pr., PC 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Rational pharmacotherapy, patient assessment, and communications related to medication use in a clinical area.
492. **CLERKSHIP — ELECTIVE AREA II (9).** Pr., PCY 461, PC 462, PC 463, PC 464, and admission to Doctor of Pharmacy degree program. Clinical rotation of five weeks (200 hours). Rational pharmacotherapy, patient assessment, and communications related to medication use in a clinical area.
495. **SPECIAL PROBLEMS (1-3).** Pr., COI. Individualized investigation of clinical pharmacy problems as related to the delivery of health care services.

Philosophy (PA)

Professors McKown, Head, Andelson, Davis, and Machan

Associate Professors Brown, Perry, and White

Assistant Professors Cumbee, Elfstrom, Walters, and Yates

111. **BASIC REASONING (3).** Elementary principles of clear thinking: meaning, definition, truth, induction, avoidance of fallacious thinking.
202. **ETHICS AND SOCIETY (5).** Examines topics of contemporary moral concern from the standpoint of various ethical theories.
210. **INTRODUCTION TO PHILOSOPHICAL PROBLEMS (3).** An introduction to the methods of philosophical inquiry and an examination of selected philosophical topics.
211. **INTRODUCTION TO DEDUCTIVE LOGIC (3).** Pr., PA 111 or COI. Principles of deduction in categorical, syllogistic, and propositional logics.
212. **INTRODUCTION TO SCIENTIFIC REASONING (3).** Pr., PA 111 or COI. Inductive techniques of hypothesis formation, and a discussion of such related problems in the theory of knowledge as perception, causation, and confirmation.
214. **INTRODUCTION TO ETHICS (3).** Surveys various schools of moral philosophy and examines types of moral theory.
216. **PHILOSOPHIES OF HUMAN NATURE (3).** Examines philosophical anthropology by surveying alternative theories of human nature.
218. **ETHICS AND THE HEALTH SCIENCES (5).** Topics such as contraception, abortion, and eugenics; human experimentation; truth in drugs and medicine; death and dying; and other health related issues in order to clarify relevant ethical considerations and to provide philosophical bases for decisions on right and wrong, good and bad, rights and responsibilities.

219. **BUSINESS ETHICS (5).** Covers normative issues associated with commerce such as advertising, management, and business abroad.
220. **HONORS LOGIC (3).** Informal fallacies; term and syllogistic logic; elementary propositional logic.
221. **HONORS PHILOSOPHY (3).** Philosophical methods and their applications to problems in epistemology and metaphysics.
222. **HONORS ETHICS (5).** Major ethical theories from the history of philosophy: their foundations in epistemology and metaphysics, and their extension into social thought.
305. **AESTHETICS (5).** Examines theories of beauty and art from Plato to contemporary thinkers.
311. **SYMBOLIC LOGIC (5).** Pr., PA 211 or COI. Propositional logic and predicate logic through relations; natural language and logic; some philosophical problems in logic.
330. **PHILOSOPHY OF RELIGION (5).** Examines the nature of religion, religious language, religious knowledge, religious theories of man and evil, and examines arguments for the existence of God and the immortality of the soul.
333. **HISTORY OF PHILOSOPHY I. ANCIENT AND EARLY MEDIEVAL (5).** Surveys of philosophic thought from the Pre-Socratics through Aquinas, emphasizing Plato and Aristotle.
334. **HISTORY OF PHILOSOPHY II. LATE MEDIEVAL AND EARLY MODERN PHILOSOPHY (5).** Surveys philosophic thought from Occam to Kant emphasizing major thinkers.
335. **HISTORY OF PHILOSOPHY III. RECENT AND CONTEMPORARY PHILOSOPHY (5).** Surveys various representatives of the major philosophical trends during these periods.
360. **POLITICAL PHILOSOPHY (5).** Combines a historical and analytical approach. The political thought of both classical and contemporary thinkers, including Plato, Aristotle, Machiavelli, Hobbes, Locke, Mill, Spencer, Marx, Rawls, and Nozick will comprise the chief focus of the course, together with such concepts as sovereignty, natural law, liberty, equality, and order.
380. **PRAGMATISM (5).** Emphasis on Peirce, James, and Dewey. Some philosophical issues examined from a pragmatic viewpoint.
401. **PHILOSOPHICAL FOUNDATIONS OF COMMUNISM (5).** Pr., junior standing. Examines the thought of Marx-Engels and its development in Kautsky, Bernstein, Lenin.
402. **EXISTENTIALISM (5).** Pr., junior standing. Selected works of such authors as Kierkegaard, Nietzsche, Sartre, Jaspers, and Heidegger.
425. **PHILOSOPHY OF MIND (5).** Pr., junior standing. Examines classical and modern texts on the phenomenology of consciousness and mind-body problems.
432. **PROCESS PHILOSOPHY (5).** Pr., junior standing. An examination of selected writings of Bergson, James, and Whitehead.
440. **CONTEMPORARY MARXISM (5).** Pr., junior standing. Examines the thought of Lukacs, Stalin, Merleau-Ponty, Sartre, Habermas, Marcuse, and others.
455. **METAPHYSICS (5).** Pr., junior standing. A critical analysis of such topics as monism and pluralism, freedom and determinism, realism and nominalism, and the mind-body problem.
460. **EPISTEMOLOGY (5).** Pr., junior standing. The origin, nature, kinds, and validity of knowledge, with a consideration of faith, intuition, belief, opinion, certainty, and probability.
470. **PLATO (5).** Pr., junior standing. Examines such topics as Plato's Methodology, epistemology, metaphysics, ethics, political theory.
475. **ARISTOTLE (5).** Pr., junior standing. Examines Aristotle's logic, epistemology, metaphysics, ethics, political theory, psychology.
479. **HONORS THESIS (3-6).** Repeatable once for a maximum of 6 hours credit. Senior thesis for students in the University Honors Program.
482. **BRITISH EMPIRICISM (5).** Pr., junior standing. Examines seventeenth and eighteenth-century empiricism emphasizing Locke, Berkeley, Hume.
484. **CONTINENTAL RATIONALISM (5).** Pr., junior standing. Examines major themes in such thinkers as Descartes, Spinoza, Leibniz, Gassendi.
492. **PHILOSOPHY OF LAW (5).** The nature and function of law including such topics as judicial reasoning, the ground of authority, natural law, legal responsibility, punishment, civil disobedience, and the relation of law to ethics and the behavioral sciences.
498. **READINGS IN PHILOSOPHY (1-10).** Pr., junior standing, a 3.25 average in relevant prior work either in philosophy or in related areas and consent of department head and instructor. Specific reading programs may be developed which pertain to a particular philosopher, period or problem. A paper and an examination will be expected. May be repeated for credit.

ADVANCED UNDERGRADUATE AND GRADUATE

504. **MODERN ETHICAL THEORIES (5).** Recent analyses of the meanings, presuppositions, and problems of ethical terms and judgments.
513. **PHENOMENOLOGY (5).** The phenomenological method and its application in the works of William James, Husserl, Heidegger, Sartre, and Merleau-Ponty.

515. **PHILOSOPHY OF SCIENCE (5).** Such topics as empirical meaning, verifiability, measurement, probability, causality, and determinism.
580. **ANALYTIC PHILOSOPHY (5).** Philosophical analysis in the twentieth century from G. E. Moore through the Oxford analysis.
590. **KANT AND TRANSCENDENTAL IDEALISM (5).** The philosophy of Kant in particular but also of the early Fichte and Schelling and of neo-Kantians.
591. **HEGEL AND ABSOLUTE IDEALISM (5).** The philosophy of Hegel in particular but also of the late Fichte and Schelling, of neo-Hegelians, and of Schopenhauer and other critics.

GRADUATE

650. **SEMINAR (1-10).** Pr., COI. The content will change for each quarter in any one calendar year. This will vary from movements of thought to an intensive study of one of the great thinkers such as Plato or Whitehead. May be repeated for credit.

Physical Science (PHS)

Associate Professors Ward and Simon

- 100-101. **INTRODUCTORY PHYSICAL SCIENCE (5-5).** **LEC. 4, LAB. 2.** An introduction to physics, chemistry, astronomy, and earth sciences for students in liberal arts, education, business, and non-science pre-professional curricula. The approach is primarily historical and cultural rather than quantitative; although adequate preparation is provided for those who will teach elementary school science. Credit in PS 200, 205, or 220 precludes credit for PHS 100.

ADVANCED UNDERGRADUATE AND GRADUATE

530. **MODERN CONCEPTS IN PHYSICAL SCIENCE I (5).** **LEC. 4, LAB. 3.** Pr., PHS 101 or PS 206, or COI, junior standing.* General physical science based on IPS materials designed to acquaint the student with the IPS approach.
531. **MODERN CONCEPTS IN PHYSICAL SCIENCE II (5).** **LEC. 4, LAB. 3.** Pr., PHS 101 or PS 206, or COI, junior standing.* A survey of physics topics using PSSC and Project Physics materials designed to acquaint the students with these approaches to high school physics.
532. **NUCLEAR SCIENCE FOR TEACHERS (5).** **LEC. 4, LAB. 3.** Pr., a course in general physics and preferably one in chemistry plus junior standing, junior or senior high school teacher, or approval of instructor.* A course in the fundamentals of atomic and nuclear structure; designed for junior and senior high school teachers, including the study of radioactivity and nuclear radiation, radiation detection, radiological safety, nuclear fission and fusion, nuclear power reactors and power generation, advantages and hazards of nuclear power reactors.

Physics (PS)

Professors Perez, Head, Alford, Askew, Clothiaux, Fromhold, Hinata,
Latimer, and Pindzola

Walter Professor Barnes

Alumni Professors Chen and Swanson

Associate Professors Kinzer, Cooper, Hyder, Fukai, Simon, Thaxton, Ward,
Wersinger, and Williams

Assistant Professors Bozack, Gandy, and Hanson

Adjunct Professor Budenstein

- 200.* **FOUNDATIONS OF PHYSICS (5).** **LEC. 4, LAB. 3.** The principles of mechanics; heat, light, sound, electricity, magnetism and selected topics from modern physics. Credit in PS 205 or 220 precludes credit for this course.
- 205-206-207. **INTRODUCTORY PHYSICS I, II, III (3-3-3).** **LEC. 3.** Pr., for PS 205, MH 160; for PS 206, PS 205; for PS 207, PS 206. Coreq., for PS 205, PS 205L; for PS 206, PS 206L; for PS 207, PS 207L. A three-quarter sequence covering topics in mechanics, fluids, heat, wave motion, sound, electricity, magnetism, light, relativity, atomic and nuclear phenomena and radiation. Quantitative as well as qualitative aspects of the subject are stressed utilizing algebra and trigonometry. Credit for the PS 220-221-222 sequence precludes credit for the 205-206-207 sequence.
- 205L-206L-207L. **INTRODUCTORY PHYSICS LABORATORY I, II, III (1-1-1).** **LAB. 3.** Coreq., for PS 205L, 205; for PS 206L, PS 206; for PS 207L, PS 207. Selected laboratory experiments paralleling the topics covered in PS 205, 206 and 207 respectively.
215. **ASTRONOMY (5).** **LEC. 4, LAB. 3.** Open to non-science majors. The planet Earth and the solar system; the stars; theories of stellar evolution, neutron stars, black holes, supernova, galaxies and the expanding universe; modern cosmological theories. The laboratory emphasizes studies with the telescope.
220. **GENERAL PHYSICS I (3).** **LEC. 3.** Coreq., MH 163, PS 220L. Mechanics using calculus. The three-quarter sequence PS 220-221-222 serves as a foundation for students enrolled in science and engineering programs.
- 220L. **GENERAL PHYSICS LABORATORY I (1).** **LAB. 3.** Coreq., PS 220. Selected laboratory experiments paralleling topics covered in PS 220.
221. **GENERAL PHYSICS II (3).** **LEC. 3.** Pr., PS 220, 220L. Coreq., PS 221L, MH 264. A continuation of PS 220 including gravity, electricity, and magnetism.
- 221L. **GENERAL PHYSICS II (1).** **LAB. 3.** Coreq., PS 221. Selected laboratory experiments paralleling topics covered in PS 221.

*Not available to graduate students in the areas of science or mathematics.

222. **GENERAL PHYSICS III (3). LEC. 3, Pr., PS 221, Coreq., PS 221L.** A continuation of PS 221 including heat, light, and sound.
- 222L. **GENERAL PHYSICS LABORATORY III (1). LAB. 3.** Coreq., PS 222. Selected laboratory experiments paralleling topics covered in PS 222.
- 300-301. **ELECTRICITY AND MAGNETISM I, II (4-4).** Pr., for PS 300, PS 222, MH 269; for PS 301, PS 300, MH 501. Electrostatics, study of fields in dielectrics, magnetic forces and their effects, electric and magnetic properties of matter, Maxwell's equations, electromagnetic waves and radiation.
302. **ELECTRONICS (5). LEC. 4, LAB. 3, Pr., PS 222, MH 269.** Review of AC and DC circuits; theory of vacuum tubes and semiconductors; diodes as rectifiers and regulators; tube and transistor voltage and power amplifiers; feedback amplifiers and oscillators; pulse and digital circuits. Appropriate laboratory exercises form a part of the course.
303. **OPTICS (4).** Pr., PS 301 or EE 392, MH 501, junior standing. Intermediate course in physical optics comprising wave motion, reflection, refraction, dispersion, origin of spectra, interference, diffraction, and polarization.
305. **INTRODUCTION TO MODERN PHYSICS (4).** Pr., PS 222 or 206, MH 265 or 269. Introduction to relativistic kinematics and dynamics, particle aspects of electromagnetic interaction, Schrodinger wave mechanics, structure of the hydrogen atom, many electron atoms, nuclear structure and reactions, elementary particles, and molecular and solid-state physics. Credit in PS 207 or 320 precludes credit in this course.
306. **PHYSICS LABORATORY (2). LAB. 6.** Pr., PS 300, 305. Selected laboratory experiments from fields of electricity, magnetism, and modern physics.
320. **MODERN PHYSICS FOR ENGINEERS (3). LEC. 3, Pr., PS 222, MH 264.** Introduction to modern physics, including special relativity, Schrodinger wave mechanics, atomic and nuclear systems, elementary particles. Credit in PS 207 or 305 precludes credit in this course.
412. **SEMINAR IN MODERN PHYSICS (1).** Pr., senior standing. Library search, written reports, and oral presentation of a pertinent topic in modern physics.
470. **HONORS THESIS (3-6).** Pr., senior standing in the honors program. May be repeated once for maximum of 6 hours credit.
491. **UNDERGRADUATE RESEARCH (3-5). LAB. 9-15.** Pr., COI and senior standing. Each student will work under the direction of a staff member on a problem of mutual interest. May be repeated for a maximum of 15 credit hours.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **MECHANICS I (5).** Pr., MH 265. Newtonian mechanics, linear oscillations, non-linear oscillation introduction to calculus of variations.
502. **MECHANICS II (5).** Pr., PS 501. Hamilton's principle and Lagrange's equations, central force motion, collisions, non-inertial frames, rigid body dynamics, vibrating systems.
504. **STATISTICAL THERMODYNAMICS (5).** Pr., PS 516 or concurrently, senior standing. Temperature, entropy, and chemical potential are developed from the principles of equilibrium quantum states. The Gibbs representation is introduced and applied to the development of equilibrium distribution functions. Quantum statistics is developed and applied to problems.
- 506-507. **EXPERIMENTAL PHYSICS I, II (2-2). LAB. 6-6.** Pr., PS 301, 302. Coreq. PS 303. Selected experiments from the areas of modern physics, optics, nuclear physics, plasmas, and solid state physics.
510. **INTRODUCTION TO REACTOR PHYSICS II (5). LEC. 4, LAB. 3.** Pr., PS 509. Homogeneous reactor with reflector; reactor control; power reactors; thermal aspects of reactor systems; design variables; radiation detection and measurement; shielding; radiation hazards.
513. **INTRODUCTION TO X-RAY CRYSTALLOGRAPHY (5). LEC. 4, LAB. 3.** Pr., PS 305, COI. Principles of crystallography, the reciprocal lattice, theory of x-ray diffraction, and the powder, laue, and diffractometer methods.
- 515-516. **INTERMEDIATE MODERN PHYSICS I, II (5-5).** Pr., MH 269, PS 305 or 320. Special theory of relativity; introductory quantum mechanics with applications to microscopic systems; Fermi-Dirac, Bose-Einstein statistics; and electronic bands in solids.
517. **INTRODUCTION TO BIOPHYSICS (5).** Pr., COI. The physics of biological systems, with emphasis on the cellular and subcellular levels; effects of light and high energy radiations, bio-electric phenomena, bio-energetics, etc.
520. **NUCLEAR PHYSICS AND ELEMENTARY PARTICLES (5).** Pr., PS 516. Radioactivity; nuclear radiation; nuclear forces, structure of nucleus, nuclear reactions, accelerators and reactors. A treatment of elementary particles including conservation laws, symmetry principles, decay modes and classification.
521. **MODERN ELECTRONICS (5). LEC. 3, LAB. 6.** Pr., PS 302. Network theory and digital logic; state-of-the-art electronic devices; operational amplifiers; linear and digital integrated circuits; servo systems; selected topics in modern instrumentation.
525. **PRINCIPLES OF NUCLEAR ENERGY SYSTEMS (5).** Pr., PS 305 or 320 and MH 265 or COI. Fundamental aspects of nuclear energy systems including: nuclear properties of matter, the fission process, radiation, nuclear reactor and plant design, thermal aspects of nuclear reactors, reactor control, safety analysis, licensing, isotope power sources, space applications, and fusion.
- 531-532-533. **METHODS OF THEORETICAL PHYSICS I, II, III (3-3-3).** Pr., MH 362. Theoretical methods used in classical and quantum physics, including applications of transformations, special functions, Green's functions, variation and perturbation theory, tensor and group theory.

535. **INTRODUCTION TO SOLID STATE PHYSICS (5).** Pr., PS 516, MH 264 or COI. Solid state phenomena including lattice vibrations, band description of electronic states in metals, semiconductors and insulators, and magnetic phenomena.
545. **PLASMA PHYSICS (4).** Pr., PS 301. COI or senior standing. Collision phenomena in gases, creation of ionized gases (plasmas), interaction of plasmas and fields, plasma heating, instabilities, radiation and applications.
560. **GENERAL THEORY OF RELATIVITY (4).** Pr., MH 269, PS 305 or 320, COI or junior standing. Tensor analysis by computer using the analytical language FORMAC. General theory of relativity with applications.
570. **HEALTH PHYSICS (5). LEC. 4, LAB. 3.** Pr., COI. Fundamental principles of radioactivity; instrumentation for detecting and monitoring radioactive nuclides; radiation effects on man; permissible radiation dosages; safe handling of radioactive substances; and shielding from various radiations.
590. **SPECIAL TOPICS IN ADVANCED PHYSICS (1-5).** Pr., COI. Topics will vary as needed. May be taken for credit more than once.

GRADUATE

- 601-602-603. **ADVANCED DYNAMICS I, II, III (3).** Pr., PS 502. D'Alembert's principle; introduction to the calculus of variations; Hamilton's principle and Hamilton's equations; principle of least action. Canonical variables and contact transformations; the Hamilton-Jacobi equation; action angle variables; Poisson brackets; continuous systems.
- 604-605-606. **THEORY OF ELECTRICITY AND MAGNETISM I, II, III (3-3-3).** Fall, Winter, Spring. Pr., PS 301 or EE 391, coreq. MH 607-608-609. Maxwell's formulation of classical electromagnetic theory. Includes electrostatics, magnetostatics, potential problems, electric currents, Maxwell's equations, electromagnetic waves, radiation theory, boundary value problems, special relativity.
607. **PHYSICAL OPTICS (3).** Pr., PS 606 or COI. Current topics in optics such as Fourier optics, diffraction theory, light scattering, laser physics, optical echoes, holography, and propagation in optical waveguides.
- 628-629. **STATISTICAL MECHANICS I, II (3-3).** Pr., PS 502, 504. Theory and applications of equilibrium statistical mechanics: relation of statistical mechanics to thermodynamics. Statistical mechanics of quantum mechanical systems. Introduction to non-equilibrium statistical mechanics. Boltzmann transport equation. Fluctuations and dissipation.
630. **MODERN PHYSICS FOR HIGH SCHOOL TEACHERS (5). LEC. 4, LAB. 3.** Pr., MH 587 or equivalent. Physics since 1890 including: structure of matter; atomic and molecular spectra; X-rays, natural and induced radioactivity; nuclear fission and fusion; and cosmic rays.
632. **SPECIAL THEORY OF RELATIVITY (3).** Pr., PS 602, 604. Relativistic mechanics, covariant formulation of Maxwell's field equations, Lagrangian and Hamiltonian formulation of fields.
639. **DIRECTED READING IN PHYSICS (2).** Pr., COI. May be repeated for credit.
- 641-642-643. **QUANTUM MECHANICS I, II, III (3-3-3).** Pr., for PS 641, 502; for 642, 641, and for 643, 642. Duality of particles and waves; uncertainty principle; wave functions and Schrodinger's equation; one-dimensional states; operator and matrix formalism; bound states problems; angular momentum; stationary and time-dependent perturbation theory; spin and identical problems; scattering theory; atoms, molecules and solids; interaction of radiation with matter.
650. **BIOLOGICAL EFFECTS OF RADIATIONS (5). LEC. 3, LAB. 6.** Pr., ZY 310 or ZY 525 or equivalent, PS 205 and 206 or equivalent, or COI. (Same as ZY 650.) Summer. An introduction to radiation biology including radiation physics: radiation detection equipment; dosimetry; the effects of ionizing radiation at molecular, cellular, organ, and organismic levels, and radioprotection.
653. **SEMINAR IN PHYSICS (2).** Pr., COI. May be repeated for credit.
655. **SPECIAL TOPICS IN THEORETICAL PHYSICS (3).** Pr., COI. Choice of topic will vary but will include: relativity theory; group theory; atomic and molecular structure; elasticity; fluid mechanics; quantum field theory; low temperature physics. May be repeated for credit.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
- 711-712-713. **PLASMA PHYSICS I, II, III (3-3-3).** Pr., PS 301, 502 or COI. Particle interactions and orbit theory, plasma kinetic theory, Boltzmann equation, transport phenomena, Fokker-Planck equation, plasma generation and diagnostics. Wave phenomena in plasmas, shock waves, plasma stability, beam plasma interactions. Radiation processes in plasmas without magnetic fields, bremsstrahlung of transverse waves, cyclotron radiation and echoes, scattering of transverse waves.
714. **PLASMA SPECTROSCOPY (3).** Pr., PS 606, 642, or COI. Classical and quantum radiation theory, line oscillator strengths, line-broadening, equilibrium relations, temperature and density measurements.
- 735-736-737. **SOLID STATE PHYSICS I, II, III (3-3-3).** Pr., PS 535, 643. Electrons in a perfect crystal lattice, description of the symmetry properties of solids, Brillouin zones. Cohesive energy; interaction of electrons with electromagnetic radiation, interactions between electrons and the crystal lattice. Magnetic properties of solids; para-, dia-, ferro-, and antiferromagnetic effects. Resonance experiments, optical properties of solids.
- 744-745-746. **ADVANCED QUANTUM MECHANICS I, II, III (3-3-3).** Pr., PS 643 or COI. Quantum optics; quantum electrodynamics; Dirac equation; Feynmann diagrams; gauge theories.
761. **NUCLEAR STRUCTURE (3).** Pr., PS 505, PS 643. Selected topics on properties of nuclei.
762. **NUCLEAR PROCESSES (3).** Pr., PS 761. Radioactive decay, nuclear reactions.

- 771-772. **ADVANCED SOLID STATE THEORY I, II (3-3).** Pr., PS 637. Quantum field theoretic methods of solving the many-body problem, second quantization, statistical mechanics in occupation number formalism, Feynmann diagrams and infinite-order perturbation theory, Green's function propagators, "dressed" interactions and quasi-particles, many-body effects in metals, Fermi liquid theory, present-day theories of super-conductivity, ferromagnetism, and other cooperative phenomena.
791. **DIRECTED READING IN CONTEMPORARY PHYSICS. (CREDIT TO BE ARRANGED.)** Pr., completion of 30 hours of advanced courses in physics. May be repeated for credit.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Plant Pathology (PLP)

Professors Jacobsen, Head, Backman, Curl, Gazaway, Gudauskas,
Morgan-Jones, and Rodriguez-Kabana
Associate Professors Clark, Hagan, and Latham
Assistant Professors Bowen and Davis
Extension Plant Pathologists Gazaway and Hagan

215. **FOREST PESTS (4).** LEC. 3, LAB. 1. Pr., BI 101, 102. Spring. Diseases and pests of forest and shade trees from seedling to maturity. Pest damage to wood products will also be discussed. Field trip will emphasize major forest pest problems in Alabama.
309. **GENERAL PLANT PATHOLOGY (5).** LEC. 4, LAB. 2. Pr., BI 101-102. Winter, Spring. Nature cause, and control of plant diseases illustrated by studies of common diseases of field crops, fruits, vegetables, turf, and ornamentals.
403. **PESTICIDES (5).** LEC. 4, LAB. 3. Pr., CH 207. Winter. The chemistry, mode of action, activity, formulations, applications, and legal aspects of pesticides and pesticide applications.
407. **CONCEPTS OF PEST MANAGEMENT (5).** LEC. 4, LAB. 3. Pr., COI. Spring. Pest management technology and philosophy.
460. **SPECIAL PROBLEMS (1-3).** Pr., COI, senior standing. All quarters. A. Pathology; B. Virology; A student cannot register for more than three hours credit in any one quarter or in any one area.

ADVANCED UNDERGRADUATE AND GRADUATE

505. **INTRODUCTORY MYCOLOGY (5).** LEC. 3, LAB. 4. Pr., BI 101-102 or equivalent. Fall. A systematic survey of the fungi with emphasis on morphology.
510. **DISEASES OF FRUITS AND VEGETABLES (3).** LEC. 2, LAB. 1. Pr., PLP 309 or equivalent. Spring. Nature, cause, and control of fruit and vegetable crop diseases illustrated by study of common diseases.
518. **PLANT DISEASE DIAGNOSIS (5).** LEC. AND LAB. 8. Pr., PLP 309 or COI. Summer. Approaches, techniques, and practical experience in the diagnosis of plant diseases.
553. **PRINCIPLES OF PLANT DISEASE CONTROL (3).** LEC. 2, LAB. 2. Pr., PLP 309 or equivalent. Spring. Plant disease control strategies; exclusion, eradication, resistance, and protection. The role of each of these disease management strategies will be studied in the development of integrated plant disease management programs that utilize cultural, biological, and chemical controls.
554. **PHYSIOLOGY OF FUNGI (5).** LEC. 3, LAB. 4. Pr., PLP 505 and one of the following: MB 300, BY 306, or ADS (CH) 518 or COI. Spring, odd years. Cellular structure, function, nutrient requirements and absorption, metabolism during the vegetative growth cycle, spore germination and spore formation, mode of action of agriculturally important fungicides, and the physiology of fungal-induced plant pathogenesis. (Same course as BY 554.)

GRADUATE

617. **PHYTOVIROLOGY (5).** LEC. 3, LAB. 4. Pr., PLP 309 or 310, MB 542. Winter, even years. Molecular biology, transmission, pathogenicity and control of viruses that infect plants.
624. **PHYTOBACTERIOLOGY (5).** LEC. 2, LAB. 6. Pr., MB 300. Spring. Experimental and theoretical aspects of isolation, identification, pathogenicity, and infectivity of plant pathogenic bacteria. (Same course as MB 624.)
625. **SPECIAL PROBLEMS. (CREDIT TO BE ARRANGED.)** A. Mycology; B. Mycotoxicology; C. Nematology; D. Pathology; E. Virology; F. Clinical Plant Pathology.
626. **ADVANCED MYCOLOGY I (5).** LEC. 2, LAB. 6. Pr., PLP 505 and COI. Spring, even years. Classification of fungi and lichens. Detailed studies of selected families of Ascomycetes and Fungi Imperfecti. Interpretation of comparative morphological criteria and ontogenic patterns as a guide to phylogeny. Intensive floristic investigations of particular habitats.
627. **ADVANCED MYCOLOGY II (5).** LEC. 2, LAB. 6. Pr., PLP 505 and COI. Spring, odd years. Classification of fungi. A detailed survey of the Myxomycetes, Phycomycetes, and Basidiomycetes. Special emphasis will be placed on ecological aspects of fungi in freshwater and forest habitats. Fungal genetics will be studied.
630. **PLANT NEMATOLOGY (5).** LEC. 2, LAB. 6. pr., PLP 309, BI 101 or COI. Winter, odd years. Various roles of nematodes in relation to plant diseases caused by nematodes and other pathogens. Identification of plant nematodes nature of pathogenicity; principles and practices of control; recent advances in phytonematology.
640. **DEPARTMENTAL FORUM (1).** Required of all majors, open to all minors. May be taken more than one quarter. Fall, Winter, Spring. Discussions concerning current topics in the various sciences and related fields.

652. **SOIL-AND SEED-BORNE DISEASES OF PLANTS (4). LEC. 2, LAB. 4.** Pr., PLP 309 or equivalent. Spring. Important diseases of seeds, roots, and other subterranean plant parts; including vascular disorders, pathogen ecology, and disease control.
664. **EPIDEMIOLOGY (4). LEC. 3, LAB. 3.** Pr., PLP 309 or equivalent. Fall, odd years. Aspects of epidemiology including pathometry, modelling plant diseases, disease progress, and yield loss assessment. Quantitative aspects of host-pathogen relationships and pathosystem management will be studied.
699. **RESEARCH AND THESIS. (CREDIT TO BE ARRANGED.)**
719. **ADVANCED PLANT PATHOLOGY (5). LEC. 3, LAB. 4.** Pr., PLP 309 or equivalent. Fall. Biological significance of etiology, epiphytology, and host-parasite relations in plant diseases. Classical and current theory will be considered in relation to concepts and problems in plant pathology.
725. **SPECIAL PROBLEMS. (CREDIT TO BE ARRANGED.)** A. Mycology; B. Mycotoxicology; C. Nematology; D. Pathology; E. Virology; F. Clinical Plant Pathology.
728. **FIELD RESEARCH IN PLANT PATHOLOGY (5). LEC. 2, LAB. 6.** Summer, odd years. Field plot design, techniques for applying pesticides, evaluation of disease development, estimation of yield losses, and analysis of data.
740. **DEPARTMENTAL FORUM (1).** Required of all doctoral students. May be taken more than one quarter. Fall, Winter, Spring. Oral presentation and discussion of research in the field of specialization.
799. **DOCTORAL RESEARCH AND DISSERTATION. (CREDIT TO BE ARRANGED.)**

Political Science (PO)

Professors Becker, Head, Dickson, Martin, Nelson, O'Toole, and Urban
Associate Professors Montjoy, Johnson, Gryski, Heilman, Latimer, and Ward
Assistant Professors Barrow, Burns, Decker, Ford, Kelly, Pickering,
Pendergast, Widell, and Zuk
Instructor Cannon
Adjunct Abbett

209. **INTRODUCTION TO AMERICAN GOVERNMENT (5).** Constitutional principles; federalism; elections and public opinion; legislative, executive, and judicial departments; principal functions.
210. **AMERICAN STATE AND LOCAL GOVERNMENT (5).** State constitutional principles; organization and functions of state government; national-state and state-local relations; special attention to Alabama government.
260. **SURVEY OF LAW ENFORCEMENT (5).** Pr., sophomore standing. (Same as LE 260.) Introduction to the philosophical and historical backgrounds; agencies and processes; purposes and functions; administration and technical problems; career orientation.
271. **HONORS POLITICAL SCIENCE (5).** Pr., admission to Auburn University Honors Program. Selected themes in American politics at the national, state, and local levels.
300. **POLITICAL SCIENCE RESEARCH METHODS (5).** Pr., PO 209 or 210 and sophomore standing. Introduction to empirical research methods in political science with attention to computer applications.
302. **INTRODUCTION TO POLITICAL THOUGHT (5).** Pr., sophomore standing. Selected major themes in political thought from ancient to modern times.
309. **INTRODUCTION TO INTERNATIONAL RELATIONS (5).** Pr., sophomore standing. International relations, including a consideration of the bases of national power and the rudiments of international politics.
311. **INTERNATIONAL ORGANIZATION (5).** Pr., sophomore standing. The evolution of international organization from the beginning through the United Nations.
312. **INTRODUCTION TO COMPARATIVE GOVERNMENT AND POLITICS (5).** Pr., sophomore standing. Methods of classifying governments by institutional and developmental characteristics. A review of the forces which create political stability and instability, democracy and dictatorship; contemporary political systems in selected countries will be used for comparison.
314. **AMERICAN FOREIGN POLICY (5).** Pr., sophomore standing. Analysis of the decision-making process of American foreign policy and of selected current issues of American foreign policy.
315. **AMERICAN POLITICAL THOUGHT (5).** Pr., sophomore standing. The principal American political philosophers and philosophies and their influence on political institutions.
316. **NATIONAL SECURITY AND FOREIGN POLICY (3).** Pr., sophomore standing. Introduction to national security aspects of United States foreign policy.
318. **LATIN AMERICA AND THE UNITED STATES (3).** An analysis of Latin American-United States relations in their political, social and economic aspects.
320. **INTERGOVERNMENTAL RELATIONS (3).** Pr., PO 209 or 210 and sophomore standing. Relationships between units of local, state and national governments in structural and policy areas; federalism in theory and practice.
323. **MUNICIPAL GOVERNMENT IN THE UNITED STATES (5).** Pr., PO 210 and sophomore standing. Functions of city government; relation of city to state; electorate, party system and popular control; forms of government; administrative organizations; some reference to Alabama.
325. **INTRODUCTION TO PUBLIC ADMINISTRATION (5).** Pr., sophomore standing. Organization, development, procedures, process, and human factors involved in administration in a political environment.

326. **THEORY OF PUBLIC ORGANIZATION** (5). Pr., PO 325 and sophomore standing. The structure and functioning of governmental organizations with an emphasis on theories of administrative hierarchies and evaluation of bureaucracy.
327. **POLICY PROCESS** (5). Pr., sophomore standing. The formulation and implementation of public policy; the roles of the major governmental institutions in policy making.
328. **GOVERNMENT AND THE ECONOMY** (5). Pr., PO 325 and sophomore standing. An examination of constitutional and political bases of governmental action; the origin and evolution of policies; relationships between political and economic institutions; and the consequences of governmental action or inaction.
329. **THE AMERICAN PRESIDENCY** (5). Pr., PO 209, sophomore standing. The President as legislative leader, chief executive, chief diplomat, and commander-in-chief. Political styles and personalities of recent presidents. Presidential decision-making.
331. **THE LEGISLATIVE PROCESS** (3). Pr., PO 209 or 210, sophomore standing. The principles, procedures, and problems of lawmaking in the United States; special attention to Congress and the state legislatures.
332. **THE JUDICIAL PROCESS** (3). Pr., sophomore standing. The role of the courts; the nature of the jurisprudence; comparative legal systems; the origin of law; and the concept of legality.
333. **ADMINISTRATIVE RESPONSIBILITY** (3). Pr., PO 325 and sophomore standing. Roles and functions of public administration in a democratic society. Emphasis on bureaucratic ethics.
336. **CRIMINAL JUSTICE** (3). Pr., sophomore standing. An in depth examination of the various procedural due process rights of the Constitution as they relate to the criminal processes — historical development, modern interpretations, and further trends.
340. **POLITICAL PARTIES AND POLITICS** (5). Pr., PO 209, sophomore standing. The nature, organization, and operation of political parties in the United States; the suffrage; nominating and electoral processes; importance and nature of interest groups.
341. **PRESSURE GROUPS** (3). Pr., sophomore standing. Major private associational groups affecting public policy in the United States. Special attention to their structures, funding, public regulation, and political activities.
342. **POLITICS AND THE MEDIA** (5). Influences of the media (broadcast and printed) on political action, the electoral process and popular concepts of political institutions; "use" of the media and its regulation by government.
410. **ADMINISTRATION AND MANAGEMENT OF RECORDS** (3). Pr., sophomore standing. The principles and use of records management in the systematic analysis and scientific control of the life cycle of governmental, business and university records in terms of quantity, quality, and cost.
412. **COMPARATIVE CRIMINAL JUSTICE SYSTEMS** (5). Pr., PO 209 and PO/LE 260, or PO 312. Institutional comparison, social control problems and policies, and functional analysis of the criminal justice systems or democratic, authoritarian, and totalitarian governments in selected countries with emphasis on policing, the judiciary and the law.
415. **JUVENILE JUSTICE** (5). Pr., SY 201 or COI. Analysis of the juvenile justice system with special emphasis on some of the unique issues and problems that are involved in the adjudication and rehabilitation of juvenile offenders. Credit for SCR 415 precludes credit for PO 415.
450. **INTERNSHIP** (5-10). Pr., PO, PUB or HA major and junior standing. (S-U grading only.) Practical political or administrative experience in public agencies or related activities arranged and approved by the department.
451. **INTERNSHIP READING COURSE** (5). Coreq., concurrent enrollment in PO 450. COI. Content of reading by agreement of student and instructor. Not open to graduate students.
471. **HONORS READINGS COURSE** (3-5). Pr., admission to the Auburn University Honors Program or the Political Science Department Honors Program. May be repeated for a maximum of six hours but a student may earn no more than a combined total of nine credit hours in PO 471 and 472. Honors students taking an internship should select this course in lieu of PO 451.
472. **HONOR RESEARCH AND THESIS** (1-3). Pr., admission to the Auburn University Honors Program or the Political Science Department Honors Program. May be repeated to a maximum of six hours but a student may earn no more than a combined total of nine credit hours in PO 471 and 472.
475. **SPECIAL TOPICS IN POLITICAL SCIENCE** (3). Pr., PO 209. Review of selected Political Science topics.

ADVANCED UNDERGRADUATE AND GRADUATE

501. **AMERICAN CONSTITUTIONAL LAW I** (5). The constitution of the United States on the basis of the decisions and opinions of the Supreme Court defining judicial review, the relationship of the executive, legislative, and judicial branches of the national government, and the federal system.
502. **AMERICAN CONSTITUTIONAL LAW II** (5). The Constitution of the United States on the basis of the leading decisions and opinions of the Supreme Court defining civil rights in relation to both national and state governments.
505. **METROPOLITAN AREA GOVERNMENTAL PROBLEMS** (3). Political, governmental, and administrative organization and actions in urban areas with many governmental entities; governmental problems resulting from urbanization and possible solutions.
514. **FINANCIAL ADMINISTRATION** (5). Pr., PO 325. Theory and practice of budgeting and the review of government financial documents.
515. **PUBLIC PERSONNEL ADMINISTRATION** (3). Pr., PO 325. Personnel policies and processes of national, state and local governments. The role of politics in public personnel management.

517. **LABOR RELATIONS IN PUBLIC ORGANIZATIONS (3).** Pr., PO 515 or MN 442. The background, legal and constitutional aspects and administration of group negotiations and collective bargaining in public employment. Credit for this course precludes credit for MN 517.
518. **ADMINISTRATIVE LAW (5).** Pr., PO 325 and PO 501 or 502. General nature of administrative law; types of administrative action and enforcement; analysis of rule-making and adjudication; administrative due process; judicial review. Case method.
519. **PROBLEMS IN PUBLIC ADMINISTRATION (3-5).** Pr., COI, senior or graduate standing. Review of selected problems in public administration through readings, case studies and individual research projects.
520. **POLITICAL THOUGHT BEFORE THE NINETEENTH CENTURY (5).** The development of political thought from the Greeks to 1800; attention to the philosophers and the early theories that are found in modern political institutions.
521. **POLITICAL BEHAVIOR (5).** Pr., PO 300 or COI. An analysis of the processes of political attitude formation. Special emphasis on the development and testing of empirical theories of political culture, political socialization process, public opinion formation and participation.
522. **RECENT AND CONTEMPORARY POLITICAL THEORY (5).** The political theories of the nineteenth and twentieth centuries; analysis and comparison of modern ideologies.
523. **COMMUNIST THEORY AND PRACTICE (3).** Marxist theory, its Leninist version and recent revisions in Western Europe, along with illustrations of actual practice drawn from all sides of the communist world.
526. **GOVERNMENTS OF WESTERN EUROPE (5).** Descriptions and analyses of the principal political structures and power systems of Western Europe with particular emphasis upon Great Britain, France, and Germany.
528. **GOVERNMENT AND POLITICS OF THE MIDDLE EAST (5).** The political environment, institutions, and processes of the Middle East countries, radicalism and conservatism in the area, the Arab-Israeli conflict, and major power interests.
533. **GOVERNMENT AND POLITICS OF THE FAR EAST (5).** The political environment, institutions, and processes of the Far East, with emphasis on China and Japan; also foreign relations of the area including Great Power interests.
535. **CONTEMPORARY INTERNATIONAL POLITICS (5).** A survey of the conflicts of national interests in contemporary international politics with special emphasis on the efforts to resolve these issues through diplomacy. This course will give students the opportunity to apply their academic training to an analysis of actual contemporary international issues.
536. **GOVERNMENT AND POLITICS OF THE SOVIET UNION (5).** The present status of the Soviet totalitarian system with attention to its origin, the essentials of the Stalinist pattern, the post-Stalinist political dynamics, and the nature and significance of contemporary changes.
537. **SOVIET FOREIGN POLICY (5).** The factors affecting Soviet foreign policy as seen in historical perspective, with emphasis on the post-war Stalinist practices and the modifications made by the post-Stalin leadership.
538. **GOVERNMENT AND POLITICS OF EASTERN EUROPE (5).** A comparative study of the political institutions of the Eastern European Communist states, emphasizing especially those features which diverge the most from the totalitarian pattern of the Stalinist era. Attention will also be given to the foreign relations of the Eastern European powers, including those with the Soviet Union and Communist China.
539. **GOVERNMENT AND POLITICS OF LATIN AMERICA (5).** The political environment, institutions, and processes of Latin America with emphasis on dynamic factors that influence the degree of democracy and authoritarianism, stability and instability, and politico/economic development in the area.
540. **INTERNATIONAL LAW (5).** The origin and development of international law with special emphasis on recent and current developments — trends.
542. **MAJOR GOVERNMENTS OF LATIN AMERICA (5).** Survey of governmental institutions and political processes in selected Latin American countries. Emphasis on Argentina, Brazil, and Mexico.
545. **POLITICS AND ADMINISTRATION OF DEVELOPING NATIONS (5).** Modernization, ideologies, system characteristics, internal stability, socio-economic development policies and the administration of development in the world's developing (Third World) nations.
552. **PROGRAM EVALUATION FOR POLITICAL SCIENTISTS AND PUBLIC ADMINISTRATORS (5).** Pr., PO 300 and junior standing. Theory and practice of action program evaluation in the public sector with attention to program planning, process assessment, and impact assessment.
590. **SEMINAR IN POLITICAL SCIENCE METHODOLOGIES (5).** Pr., senior or graduate standing. Critical review of the literature on approaches, analytical constructs, research techniques and data compilation in national and cross-national perspectives.

GRADUATE

600. **RESEARCH METHODS (5).** Statistics and other quantitative techniques for the analysis of policy and for administrative decision making.
611. **SEMINAR IN AMERICAN GOVERNMENT (3-5).** A systematic examination of functions, problems, and issues within the political and constitutional framework of selected areas of American government.
613. **SEMINAR IN STATE AND LOCAL GOVERNMENT (3-5).** A systematic examination of functions, problems, and issues within the political and constitutional framework of selected areas of state and local government. Some attention will be given to Alabama.
614. **FINANCIAL ADMINISTRATION (5).** Theory and practice in budgeting, governmental accounting, the review of financial data, and the politics of the public budgeting process.
615. **PUBLIC PERSONNEL ADMINISTRATION (5).** Personnel policies, processes, and politics in American governments.

618. **ADMINISTRATIVE LAW (5).** Analysis of administrative rule-making and adjudication, administrative due process, judicial review of administrative actions.
620. **INTERGOVERNMENTAL RELATIONS (5).** Political, administrative, and fiscal aspects of the relations among American federal, state, and local governments.
625. **SEMINAR IN POLITICAL PARTIES, PRESSURE GROUPS AND POLITICAL ISSUES IN THE UNITED STATES (5).** The interaction of political parties, pressure groups and the general public as a determinant in resolving political issues.
626. **ORGANIZATIONAL THEORY AND ADMINISTRATIVE BEHAVIOR (5).** The structure and functioning of government organizations. Course includes coverage of research literature.
633. **SEMINAR ON ADMINISTRATIVE LEADERSHIP, RESPONSIBILITY, AND DEMOCRATIC GOVERNMENT (5).** Problems of ethics, democratic theory, and leadership as they relate to public administration.
635. **SEMINAR IN PUBLIC ADMINISTRATION (5).** Various processes, functions, theories, practices and systems as treated in the literature of public administration.
636. **SEMINAR IN POLICY AND ADMINISTRATION (5).** Formation, execution, and evaluation of public policy, plus in depth analysis of selected policy areas.
640. **COMPARATIVE PUBLIC ADMINISTRATION (5).** The structure and functioning of public administration in representative political systems.
645. **SEMINAR IN COMPARATIVE GOVERNMENT (5).** The major institutions, functions, and problems of representative political systems. Includes the methodology and bibliography of comparative government and politics.
650. **MPA INTERNSHIP (10).** Administrative experience in a governmental agency or participation in an approved governmental research project. For students without substantial government experience.
655. **SEMINAR IN INTERNATIONAL RELATIONS (5).** The basic literature of the field of International Relations with special emphasis on the critical evaluation of this material.
660. **MPA RESEARCH PROJECT (10).** Requires the completion and approval of a paper related to a policy or administrative issue or problem. For students with substantial government experience.
665. **SEMINAR IN POLITICAL THEORY (3-5).** The problems of scope and methods of inquiry in the fields of political theory with intensive research in selected topics.
675. **SEMINAR IN CONSTITUTIONAL LAW (5).** Selected areas of constitutional law with the readings in depth in relevant cases and constitutional theory.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**

READING COURSES

Directed reading courses enable graduate students to pursue specialized topics. They require permission of the department head or graduate adviser, and the supervisory professor and may be repeated for credit. Normally a reading course in a subject should be taken after the seminar in that subject. Except by special permission no more than two reading courses may be taken in a master's program.

617. **READING COURSE IN AMERICAN GOVERNMENT (3-5).**
637. **READING COURSE IN PUBLIC ADMINISTRATION (3-5).**
647. **READING COURSE IN COMPARATIVE GOVERNMENT (3-5).**
657. **READING COURSE IN INTERNATIONAL RELATIONS (3-5).**
667. **READING COURSE IN POLITICAL THEORY (3-5).**

Poultry Science (PH)

Professors Brewer, Head, McDaniel, Moore, Mora, Moran, and Roland
Adjunct Professor Sexton

Associate Professors Giambone, Johnson, and Renden
Extension Specialists Bilgili, Bushong, and Eckman

201. **POULTRY SCIENCE (5). LEC. 4, LAB. 2.** Fall, Spring. Principles of poultry production, including breeding, feeding, housing and diseases.
401. **JUNIOR-SENIOR SEMINAR (1).** Pr., junior standing. Fall. Experience in analyzing and presenting assigned subjects relative to the poultry industry.
402. **POULTRY SCIENCE INTERNSHIP (5-15).** COI, S-U graded, Fall, Winter, Spring, Summer. To provide students with practical on-the-job training in the poultry business.
- 407-409. **SUPERVISED AVIAN INVESTIGATIONS (3-3). LEC. 1, LAB. 4.** Pr., junior standing and COI. All quarters. Investigation of some phase of avian science of interest to the student.
410. **POULTRY BREEDING (3).** Pr., ZY 300 or COI. Spring, odd years. History, breeding systems, inheritance and selection for economic traits and influence of environment on modern breeds of poultry.

422. **AVIAN DISEASES (4). LEC. 4.** Winter. Etiology, transmission, diagnosis, prevention and treatment of infectious and parasitic diseases. (For veterinary students only.)

ADVANCED UNDERGRADUATE AND GRADUATE

501. **COMMERCIAL MEAT PRODUCTION (5). LEC. 5.** Winter, even years. Principles of management of commercial poultry and meat production with major emphasis on broiler production.
502. **COMMERCIAL EGG PRODUCTION (5). LEC. 5.** Winter, odd years. Principles of management of commercial egg production, processing and marketing.
505. **POULTRY FEEDING (5). LEC. 4, LAB. 2.** Pr., PH 201. Fall, odd years. Composition and use of poultry feeds in connection with the demands for body growth, body maintenance, and egg production.
506. **FERTILITY AND HATCHABILITY OF AVIAN SPECIES (5). LEC 4, LAB. 2.** Pr., PH 201 or COI. Spring, even years. Fertility, artificial insemination, embryonic development, and hatchability of the avian species as it relates to hatchery operation and management.
508. **CONTROL OF POULTRY DISEASES AND PARASITES (5). LEC. 4, LAB. 2.** Spring, even years. Prevention, diagnosis, control and treatment of the common diseases of poultry.
511. **PROCESSING AND MARKETING (5). LEC. 4, LAB. 2.** Spring, odd years. Problems involved in processing and marketing poultry meat and eggs.
515. **AVIAN REPRODUCTION AND ENVIRONMENTAL PHYSIOLOGY (5). LEC. 5.** Pr., ZY 316. Winter, even years. Reproductive processes and physiological responses to environmental stimuli in domestic poultry.
593. **PRACTICUM (1-5).** May be repeated not to exceed 10 hours credit. Not open to majors in Poultry Science. Provides students with experience in Poultry Science closely relating theory and practice, usually carried on simultaneously.

GRADUATE

604. **ADVANCED POULTRY PRODUCTION (5). LEC. 5.** Spring. Advanced studies on various phases of poultry production.
606. **ADVANCED POULTRY BREEDING (5). LEC. 4, LAB. 2.** Fall. Advanced principles of heredity as applied to poultry breeding.
607. **SPECIAL PROBLEMS (CREDIT TO BE ARRANGED.)** COI, all quarters. (a) nutrition. (b) physiology. (c) path- parasitology. (d) microbiology. (e) immunochemistry. (f) management. (g) transmission EM (fall only). (h) scanning EM (fall only).
608. **SEMINAR (CREDIT TO BE ARRANGED.)** Fall, Spring, Winter, Summer.
610. **ADVANCED POULTRY NUTRITION (5). LEC. 4, LAB. 2.** Pr., PH 505 or equivalent. Winter, odd years. Nutrients, their function and the nutritional requirements of poultry.
611. **ADVANCED POULTRY MANAGEMENT (5). LEC. 5.** Summer. Principles of management of commercial poultry flocks.
612. **ADVANCED POULTRY DISEASES (5). LEC. 1, LAB. 8.** Pr., PH 508 or COI. Spring, odd years. Isolation, cultivation, and identification of bacterial, fungal, and viral agents. Emphasis on biochemical aspects of microbial and nutritional diseases and the mechanisms of the immune response.
613. **ADVANCED POULTRY DISEASES (5). LEC. 1, LAB. 8.** Pr., VM 518 and PH 612, or equivalent. Spring, even years. Continuation of PH 612 with emphasis on those disease conditions caused by protozoa, helminths, and arthropods and the gross and histopathology of diseases studied in both quarters.
614. **IMMUNOCHEMISTRY (5). LEC. 3, LAB. 4.** Pr., general bacteriology, immunology and organic or biochemistry. Fall, even years. Fundamental principles of immunology including specificity, antibody synthesis and the thermodynamics of antigen-antibody reactions. Laboratory will include the use of immunodiffusion, immunoelectrophoresis, fluorescent-antibody technique and quantitation of the precipitin reaction.
615. **AVIAN PHYSIOLOGY (5). LEC. 2, LAB. 6.** Pr., ZY 524 and organic chemistry. Fall, odd years. General physiology of birds with particular reference to domesticated species.
618. **EXPERIMENTAL VIROLOGY (5). LEC. 3, LAB. 4.** Pr., BY 542 and CH 520 or equivalent and COI. Fall, odd years. Properties of plant, animal and bacterial viruses including biochemical and biophysical properties and mechanisms of infection. Laboratory includes isolation, purification and fractionation of viruses; identification of anti-viral agents using in vitro systems.
620. **TRANSMISSION AND SCANNING ELECTRON MICROSCOPY (5). LEC. 2, LAB. 6.** Pr., COI, graduate standing. Spring. Theory and operation of the transmission and scanning electron microscopes, techniques in fixation, embedding, sectioning, and staining. Interpretation of ultrastructures.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** All quarters.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** All quarters.

Psychology (PG)

Professors Hopkins, Head, Burkhart, Green, Gynther, Harzem, Johnston,
Lewis, and Schaeffer

Associate Professors Buskist and McCoy

Assistant Professors Newland, Rosenfarb, Stanton, and Tylanda

211. **PSYCHOLOGY (5).** An introduction to the field of behavior.
212. **DEVELOPMENTAL PSYCHOLOGY (5).** An introduction to cognitive, social and emotional development across the life span.
213. **PSYCHOLOGY OF ADJUSTMENT (5).** The dynamics of normal interpersonal relationships and personal adjustment. Does not count toward the major in psychology.
300. **INTRODUCTION TO CLINICAL AND COMMUNITY PSYCHOLOGY (3).** Pr., PG 211. Introduction to theory and methods of clinical and community psychology.
301. **PSYCHOLOGY IN THE CRIMINAL JUSTICE SYSTEM (5).** LEC. 4, LAB. 2. Pr., PG 211. Introduction to theory, research, and applications of psychological principles in the criminal justice system.
302. **PSYCHOLOGICAL ASPECTS OF DEATH AND DYING (3).** Pr., sophomore standing. A survey of psychological literature on dying, death and grief.
314. **PSYCHOLOGY AS A SCIENCE (3).** Introduction to the use of the scientific method in psychology.
315. **QUANTITATIVE METHODS (5).** LEC. 3, LAB. 4. Pr., PG 211 and MH 140 or equivalent. Introduction to the measurement of behavior and to quantitative methods of data analysis.
320. **EXPERIMENTAL PSYCHOLOGY I: LEARNING (5).** LEC. 3, LAB. 3. Pr., PG 211 and 315. Concepts, problems, and experimental techniques in learning.
321. **EXPERIMENTAL PSYCHOLOGY II: SENSORY PROCESSES (5).** LEC. 3, LAB. 3. Pr., PG 211 and 315 or departmental approval. Discrimination, generalization, and their physical and psychological correlates.
322. **EXPERIMENTAL PSYCHOLOGY III: PERSONALITY (5).** LEC. 3, LAB. 3. Pr., PG 320. Introduction to personality with emphasis placed on the nature, description, dynamics and determinants of personality.
330. **EXPERIMENTAL PSYCHOLOGY IV: SOCIAL (5).** LEC. 4, LAB. 2. Pr., PG 211 or SY 201 and PG 212 or SY 204 or SW 375. Introduction to the field of social psychology. Laboratory work relating to investigation of social psychological problems, data collection and analysis, and report writing.
350. **BEHAVIOR MODIFICATION IN EARLY CHILDHOOD (5).** LEC. 3, LAB. 4. Pr., departmental approval. Application of learning principles to the modification of behavior in the preschool child. Laboratory practice will supplement classroom discussion.
412. **ADVANCED DEVELOPMENTAL PSYCHOLOGY (5).** Pr., PG 212 and 314 or COI. Advanced topics in developmental psychology selected from among cognitive, emotional and social processes in child and/or life-span development.
420. **PSYCHOLOGY OF WOMEN (5).** Pr., junior standing. Women from a psychological point of view covering stereotypes, roles, and origins of sex differences.
431. **SOCIAL PSYCHOLOGY (5).** Pr., departmental approval, junior standing. Social psychological processes and theories of social behavior.
433. **PERSONALITY (5).** Pr., 10 hours of psychology or departmental approval. Objective, phenomenological, and psychoanalytic theories of personality.
435. **ABNORMAL PSYCHOLOGY (5).** Pr., 10 hours of psychology or departmental approval. Types of abnormal behavior and their social and biological origins. Opportunities for field trips.
440. **PHYSIOLOGICAL PSYCHOLOGY (5).** Pr., PG 320 and 321 or departmental approval. The physiological correlates of behavior.
444. **PSYCHOLOGICAL ASPECTS OF SEXUAL BEHAVIOR (5).** Pr., junior standing. Human sexuality from a psychobiological perspective.
450. **LEARNING (5).** Pr., PG 320 or departmental approval. Theories of learning and their logical and empirical foundations.
465. **PSYCHOLOGY AND DESIGN (5).** Principles of psychology relating to the design of equipment and environments.
480. **HISTORY OF PSYCHOLOGY (5).** Pr., 20 hours of psychology or departmental approval. Evolution of psychology from physics, physiology, and philosophy to a science of behavior.

ADVANCED UNDERGRADUATE AND GRADUATE

507. **MATURITY AND AGING (5).** Pr., PG 212. Development psychology relating to changes in and problems of human maturity from early adulthood to old age.
515. **INTRODUCTION TO THEORY OF MEASUREMENT (5).** Pr., PG 315 or departmental approval. Theories of measurement and psychological testing with examples of their applications.
516. **PSYCHOLOGICAL TESTING (5).** LEC. 3, LAB. 6. Pr., PG 515 or departmental approval. Issues and applications of group assessment techniques.

530. **PERCEPTION (5).** Pr., PG 321 or departmental approval. Theories of perception, emphasizing both general and individual factors that influence meaning.
534. **PSYCHOLOGY OF EXCEPTIONAL CHILDREN (5).** Pr., PG 212. Psychological aspects of handicapped and gifted children.
536. **PSYCHOLOGY OF ABNORMAL CHILDREN AND ADOLESCENTS (5).** Pr., PG 212. Introduction to cognitive, emotional, and behavioral disturbances in children and adolescents.
545. **ANIMAL BEHAVIOR (5).** Pr., PG 320 and 321 or departmental approval. Analysis of unlearned and learned animal behavior and its evolutionary development, integrating the contributions of ethological and behavioristic research.
555. **HUMAN LEARNING AND MEMORY (5).** Pr., PG 320 or departmental approval. Survey of research methodology, empirical data, and theoretical interpretations relevant to the acquisition, retention and forgetting of verbal concepts and verbal materials.
557. **TECHNIQUES AND APPLICATIONS OF BEHAVIOR THERAPY (5).** Pr., PG 320 or 350 and departmental approval. Analysis of empirically derived therapeutic procedures and their application to socially and clinically relevant behavior.
561. **INDUSTRIAL PSYCHOLOGY (5).** The uses of psychology in business and industry.
562. **TRAINING AND SUPERVISION OF INDUSTRIAL PERSONNEL (3).** Application of the principles of learning to the training of factory, office, and sales employees.
563. **INTERVIEWING AND CLASSIFYING INDUSTRIAL PERSONNEL (3).** Principles and practices in interviewing.
590. **INDEPENDENT STUDY (1-5).** Pr., departmental approval. An individual problems course. Each student will work under the direction of a staff member on some experimental or theoretical problem of mutual interest. May be repeated for a maximum of 15 hours, but only 10 hours will count toward the major in psychology.
595. **SEMINAR IN PSYCHOLOGY (1-5).** Pr., departmental approval. Seminars on research and theory in various areas of psychology.

GRADUATE

600. **HISTORY, THEORIES, AND SYSTEMS IN PSYCHOLOGY (5).** A survey of historical developments in psychology with emphasis on the major theories and systems which have had an impact on current conceptions in psychology.
601. **ETHICS AND PROBLEMS OF PROFESSIONAL AND SCIENTIFIC PSYCHOLOGY (2).** Survey of ethical issues and current problems in professional and scientific psychology.
602. **COMMUNITY PSYCHOLOGY (3).** Historical overview of community psychology and analysis of empirical and theoretical issues in community psychology.
604. **CONCEPTUAL AND THEORETICAL ANALYSIS IN PSYCHOLOGY (5).** Pr., PG 480 and PG 600 or COI. Techniques of conceptual analysis with reference to interpretation and integration of psychological data, and evaluation of alternative theories.
606. **ADVANCED PSYCHOLOGY OF ABNORMAL CHILDREN AND ADOLESCENTS (5).** Pr., PG 601, PG 605 and COI. An examination of the current research and theory of behavioral, cognitive, and emotional disorders in childhood and adolescence.
607. **PSYCHOLOGICAL ASSESSMENT OF CHILDREN (5).** Pr., PG 606, 670. Psychology majors only, with supervised practicum. Introduction to the cognitive and personality assessment of infants, children, and adolescents.
608. **TECHNIQUES OF PSYCHOTHERAPY AND BEHAVIOR CHANGE WITH CHILDREN (5).** Pr., PG 607 and COI. Introduction to methods of prevention and treatment of cognitive, emotional, and behavioral disorders of children and adolescents.
610. **ADVANCED INDUSTRIAL PSYCHOLOGY (5).** Pr., PG 315 and 561 or COI. Analysis of major issues in industrial psychology.
611. **ADVANCED ORGANIZATIONAL PSYCHOLOGY (5).** Pr., PG 561 or COI. Analysis of major issues in organizational psychology.
612. **CLINICAL/INDUSTRIAL PSYCHOLOGY (5).** Pr., PG 610 and 611 or COI. Mental health issues in work organizations, and strategies of organizational intervention.
613. **PSYCHOMETRIC THEORY (5).** Pr., PG 515 and COI. Analysis of the mathematical models which underlie various approaches to psychological tests and measurements.
614. **INSTRUMENTATION IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY (5).** Pr., PG 610 and 611 or COI. Construction and use of measurement devices employed in industrial/organizational psychology.
618. **TOPICS IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY (1-5).** Pr., 610 and COI. In-depth analysis of specific topics in industrial/organizational psychology. May be repeated for a maximum of 15 hours credit.
619. **PRACTICUM IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY (1-5).** Pr., 20 graduate hours in industrial/organizational psychology and departmental approval. Individual supervised practicum in industrial/organizational psychology with an emphasis on the development of applied skills.
620. **LEARNING AND CONDITIONING (5). LEC. 4, LAB. 2.** Pr., PG 320 or departmental approval. Respondent conditioning and operant behavior, including acquisition of language and other forms of individual/environment interactions.
621. **SENSATION AND PERCEPTION (5). LEC. 4, LAB. 2.** Sensory and perceptual processes.
622. **SOCIAL PSYCHOLOGY (5).** Survey of topics and literature in social psychology.

623. **EXPERIMENTAL PSYCHOLOGY: DEVELOPMENTAL (5).** Examination and critical analysis of research on selected topics and theories in developmental psychology.
624. **PHYSIOLOGICAL PSYCHOLOGY (5). LEC. 5, Pr., PG 621.** Physiological basis of behavior.
625. **RESEARCH DESIGN (3).** Methods and techniques of designing psychological research.
626. **QUANTITATIVE METHODS I (4).** Pr., PG 315 or departmental approval. The application of analysis of variance techniques to psychological data.
627. **QUANTITATIVE METHODS II (4).** Pr., PG 626. The application of regression and correlational techniques to psychological data.
628. **QUANTITATIVE METHODS III (4).** Pr., PG 627. Further applications of regression techniques to psychological data. Includes such topics as path analysis, analysis of covariance, and unequal N's analysis of variance.
629. **QUANTITATIVE METHODS IV (4).** Pr., PG 628. Application of multivariate techniques such as multivariate analysis of variance, discriminant analysis, and canonical correlation to psychological data.
630. **QUANTITATIVE METHODS V (4).** Pr., PG 627. Factor analysis, analysis of time-dependent data and other quantitative problems of interest to applied/professional psychologists.
634. **GROUP BEHAVIOR CHANGE (5).** Pr., PG 637, 638 and departmental approval. Group psychotherapy and behavioral group techniques.
635. **THEORIES OF PERSONALITY (5).** Pr., PG 601. Analysis of current issues in personality theory.
636. **MOTIVATION AND REINFORCEMENT (5).** Pr., PG 600, PG 620 or COI. Recent literature on motivation and the process of reinforcement; critical review of current theories of motivation.
637. **ADVANCED PSYCHOLOGY OF ABNORMAL ADULTS (5).** Pr., PG 601. Current theoretical conceptions and research in psychopathology.
638. **SYSTEMS OF PSYCHOTHERAPY (5).** Pr., PG 635 and 637, or COI. A survey of theories and research related to modern systems of psychotherapy.
639. **PRACTICUM IN BEHAVIOR CHANGE (1-5).** Pr., PG 635, 637, 638 and/or COI. Must be taken at least four consecutive quarters. A minimum of 8 hours is required for Ph.D. in clinical psychology. May be repeated for a maximum of 20 hours. Psychology majors only. Individual supervision in psychotherapy and behavior change with emphasis on developing applied clinical skills.
640. **PHYSIOLOGICAL PSYCHOLOGY (5). LEC. 2, LAB. 10.** Pr., PG 621. Physiological basis of behavior.
641. **EXPERIMENTAL METHODS IN BEHAVIORAL RESEARCH I (5). LEC. 4, LAB. 2.** Pr., PG 620. Strategies and tactics of measuring the behavior of individual subjects.
642. **EXPERIMENTAL METHODS IN BEHAVIORAL RESEARCH II (5). LEC. 4, LAB. 2.** Pr., PG 641. Strategies and tactics of within-subject experimental design.
645. **COMPARATIVE PSYCHOLOGY (5). LEC. 2, LAB. 10.** Pr., PG 620. Analysis of intra- and inter-species behavior emphasizing physical and physiological uniquenesses, response comparability, and generalizability, of behavioral principles.
650. **THEORIES OF LEARNING (5).** Pr., PG 620. A survey of major theories of learning.
651. **CURRENT DEVELOPMENTS IN THEORIES OF BEHAVIOR (5).** Pr., PG 550 and 650 or COI. Analysis and evaluation of current developments in theories of behavior.
652. **ISSUES IN APPLIED BEHAVIORAL RESEARCH AND PRACTICE (5).** Pr., PG 620. Critical examination of the history, research directions, and issues in technological behavioral research and practice.
654. **HUMAN OPERANT BEHAVIOR (5).** Pr., PG 620. Critical survey of studies of human operant behavior.
655. **INTRODUCTION TO COGNITIVE PSYCHOLOGY (5). LEC. 3, LAB. 4.** Pr., PG 620 or departmental approval. Survey of the nature of humans intellectual functioning, including pattern recognition, memory, problem solving, reasoning and language comprehension and generation.
656. **BEHAVIOR MODIFICATION (5). LEC. 3, LAB. 4.** Pr., PG 601. Principles of behavior modification and practical experience to supplement classroom discussion.
657. **ADVANCED BEHAVIOR THERAPY (5).** Pr., PG 656 and/or COI. The application of behavior therapy procedures within a single-case methodological framework.
668. **BEHAVIORAL ASSESSMENT (5).** Pr., PG 641, 642. Introduction to the conceptual foundations and techniques of behavioral assessment.
669. **OBJECTIVE TECHNIQUES OF ASSESSMENT (5).** Pr., PG 515. Theory and application of methods of objective measures of aptitudes, performance, and personality.
670. **ASSESSMENT OF INTELLIGENCE (5). LEC. 3, LAB. 10.** Pr., PG 669 and departmental approval. Theories of intelligence; supervised practice in the administration and interpretation of individual intelligence tests.
671. **PERSONALITY ASSESSMENT I (5). LEC. 3, LAB. 6.** Pr., PG 669 and departmental approval. Theory and application of methods of personality measurements with emphasis on interview and self-report data, and on the interpretation of tests of specific behavioral deficits.
672. **PERSONALITY ASSESSMENT II (5). LEC. 3, LAB. 6.** Pr., PG 669 and departmental approval. Psychology majors only. Theory and application of methods of personality assessment with emphasis on projective techniques and supervised practicum experience.
673. **PERSONALITY ASSESSMENT III. (CREDIT TO BE ARRANGED.)** Psychology majors only. Supervised practicum in personality assessment. Maximum of 5 hours credit may be applied to minimum requirements for master's degree.

676. **TEACHING OF PSYCHOLOGY (1-3).** Pr., departmental approval. (S-U grading only.) The problems and practices of teaching psychology at the college level. In addition to seminar meetings, students will work with senior faculty in appropriate courses. May be taken more than one quarter; credit in this course cannot count toward fulfilling the minimum 45 graduate hours for a master's degree.
680. **CURRENT RESEARCH IN PSYCHOLOGY (2).** Pr., COI. Review of current research on selected topics in psychology. Six hours credit in this course required of all doctoral students. May be repeated for a maximum of 10 hours credit.
690. **SEMINAR (CREDIT TO BE ARRANGED.)** May be taken more than one quarter but not more than one registration permitted in any one quarter.
692. **RESEARCH IN SPECIAL TOPICS (CREDIT TO BE ARRANGED.)** S-U grading only. May be taken more than one quarter but not more than one registration permitted in any one quarter.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be repeated for credit.
731. **ADVANCED SOCIAL PSYCHOLOGY (5).** Pr., PG 622 or COI. Theories, research, and issues in contemporary social psychology.
790. **SEMINAR (CREDIT TO BE ARRANGED.)** May be taken more than one quarter, but not more than one registration permitted in any one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be repeated for credit.

Rehabilitation and Special Education (RSE)

Professors Eaves and Simpson

Associate Professors Couch, Darch, Diebold, Acting Head, R. McDaniel, McLean, and Wood

Assistant Professors S. Baird, C. Brown, M. Cooper, B. Crews, Crumpton, and Tomlin

Instructors R. Crews and M. Haynes

RSE Continuing Education and Extension Coordinator S.E. Cosgrove

Extension Associates Carruth, S.H. Cosgrove, Fober, Goodman, Lamar,

Leonard, and McClanahan

*B.S. in Ed., M.Ed., M.S. in Ed., Ed.S., and Ed.D. degrees are offered in the Department of Rehabilitation and Special Education. At the Bachelor's and Master's degree levels in Special Education, students are prepared for positions as teachers or clinicians in public schools and other agencies which serve exceptional children and youth. The Bachelor's and Master's degree programs in Rehabilitation prepares students for positions as vocational rehabilitation specialists, vocational evaluation specialists, and rehabilitation facility administrators in public schools and other agencies serving exceptional youth and adults. The goal of the Ed.S. and Ed.D. programs is to prepare advanced graduate students to assume leadership positions in the areas of university teaching, research, and administration of direct service programs for exceptional children and adults.

**Certain sections of common offerings are identified by use of letter designations as noted: (H) Mild Learning Handicapped, (L) Learning Disabilities, (M) Multihandicapped, (N) Speech-Language Pathology, (O) Emotional Disturbance, (P) Mental Retardation, (Q) General Rehabilitation and Special Education, (R) Rehabilitation, and (S) Early Childhood Education for the Handicapped.

- 102.** **ORIENTATION FOR TRANSFER STUDENTS (1).** Helps transfers from other curricula and students outside the dual objectives program to understand teacher education and teaching as a profession.
- 104.** **ORIENTATION TO LABORATORY EXPERIENCES FOR TRANSFER (1).**
300. **CURRICULUM PLANNING FOR THE HANDICAPPED CHILD (N-4) (5).** LEC. 4, LAB. 2. Pr., admission to Teacher Education, RSE 376, RSE 377, or RSE 378 or equivalent. This course provides students with an understanding of a functionally/developmental approach to the selection, development, implementation, and evaluation of appropriate curriculum activities for the instruction of mildly, moderately, and severely handicapped children, N-4. Content includes individualized and group approaches to curriculum.
301. **CURRICULUM PLANNING FOR THE HANDICAPPED CHILD, GRADES 5-12 (5).** LEC. 4, LAB. 2. Pr., admission to Teacher Education, RSE 376, RSE 377, or RSE 378 or equivalent. The design and implementation of appropriate curriculum modes for the handicapped in grades 5-12.
330. **CAREERS IN REHABILITATION SERVICES (5).** History, legal basis, and fields of rehabilitation services. Exploration of specialty fields in medical and vocational rehabilitation such as occupational and physical therapy, speech pathology, social work, vocational evaluation, adjustment services, and rehabilitation counseling. Emphasis on those working with disabled persons and adjustment to disability.
375. **INTRODUCTION TO REHABILITATION AND SPECIAL EDUCATION (5).** Pr., for RSE majors only or COI. Introduction to the various areas of exceptionality with emphasis on the historical and research base associated with providing services to exceptional people.
376. **SURVEY OF EXCEPTIONALITY (5).** Pr., for non-RSE students majoring in the various fields of education. An introduction to the major categories of exceptionalities with an emphasis upon the educational and training implications of each.

377. **INTRODUCTION TO MENTAL RETARDATION (5).** Pr., RSE 376 or COI. An introductory exploration of mental retardation as a special type of exceptionality with emphasis placed upon implications for the education and training of the retarded.
378. **AN INTRODUCTION TO BEHAVIOR DISTURBANCE (5).** Pr., RSE 376 or COI. An introductory exploration of behavior disturbance as a special type of exceptionality with emphasis placed upon implications for the education and training of the behavior disturbed.
414. **ASSESSMENT TECHNIQUES IN REHABILITATION (3).** LEC. 2, LAB. 2. Pr., admission to Teacher Education and FED 320 or equivalent. Program planning principles involved in designing program activities for specific area of specialization.
415. **TEACHING AND BEHAVIORAL CHANGE IN REHABILITATION (3-5).** LEC. 2, LAB. 2. Pr., admission to Teacher Education and FED 320 or equivalent. Understanding of curriculum content, methods and techniques of instruction using appropriate instructional materials, planning and evaluation of instruction for specific area of specialization.
- 420.** **ORGANIZING INSTRUCTION FOR SPECIAL EDUCATION (5).** LEC. 4, LAB. 4. Pr., RSE 376, 378, or COI. Provides the student with skills necessary to organize the special education instructional program in area of specialization.
- 421.** **EDUCATIONAL DIAGNOSIS AND ASSESSMENT IN SPECIAL EDUCATION (5).** LEC. 4, LAB. 2. Pr., FED 400. Application of concepts in measurement and evaluation in education: Selection/Construction of instruments, collection, summation, and interpretation of diagnostic/assessment data. Emphasis is on diagnostic/assessment instruments most appropriate for referred exceptional students.
- 425.** **PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, admission to Teacher Education prior to Internship, appropriate professional courses. Provides supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled discussion periods designed to provide positive evaluation and analysis of the intern experience.
- 446.** **DIRECTED INDEPENDENT STUDY (1-10).** The student's learning efforts are guided toward desired objective. Includes evaluation by professor and student of work accomplished at regular intervals.
- 450.** **SPECIAL TOPICS (1-5).** Seniors and professors pursue cooperatively selected concepts and theoretical formulations.
- 479.** **METHODS AND MATERIALS FOR TEACHING IN SPECIAL EDUCATION (5).** Pr., RSE 375 or 376 and 420.
- 495.** **PRACTICUM (1-10).** Provides experiences closely relating theory and practice, usually carried on simultaneously.

ADVANCED UNDERGRADUATE AND GRADUATE

505. **NATURE AND NEEDS OF THE GIFTED AND TALENTED (4).** Provides opportunities for students to develop knowledge about the field of gifted education and awareness of the nature and needs of high ability children. Emphasis on history, philosophy, and underlying assumptions of gifted education, identification and characteristics of high ability children.
510. **OCCUPATIONAL INFORMATION (3).** LEC. 2, LAB. 2. Pr., junior standing. (Also listed as VED 510.)
529. **LEARNING DISABILITIES (5).** Pr., RSE 375 or 376 or 600 or COI, junior standing. Theoretical issues, research, diagnosis, and educational approaches involved with children with learning disabilities. Observations of educational settings for children with learning disabilities are required.
- 530.* **EVALUATION AND TRAINING IN VOCATIONAL REHABILITATION (4).** LEC. 3 HOURS DAILY FOR 6 WEEKS, INTERNSHIP 4 WEEKS. Pr., junior standing. Purposes, principles and techniques of client evaluation and training, including personal, social and physical adjustment, vocational choice and selected techniques used in the evaluation and training process.
- 531.* **RESEARCH IN EVALUATION AND TRAINING IN VOCATIONAL REHABILITATION (4).** LEC. 3 HOURS DAILY FOR 6 WEEKS, INTERNSHIP 4 WEEKS. Pr., junior standing. A problem using research techniques, to be selected in consultation with the supervising professor.
- 532.* **INSTRUCTIONAL PROGRAMS IN WORKSHOPS AND REHABILITATION FACILITIES (5).**
- 533.* **MANAGEMENT OF VOCATIONAL REHABILITATION WORKSHOPS AND FACILITIES (5).**
535. **INTRODUCTION TO VOCATIONAL EVALUATION (5).** Pr., junior standing. History, philosophy, theoretical bases, and present status of vocational evaluation. Survey of the vocational evaluation process, principles, techniques, and procedure. Innovative methodology and future trends in vocational evaluation are explored.
536. **SYSTEMS OF VOCATIONAL EVALUATION (3).** LEC. 1, LAB. 4. Pr., VED 535, junior standing. Instruction and supervised practice in the application of the GATB, the JEVs system, the TOWER system, the Singer/Graflex system and related techniques of vocational evaluation.
537. **OCCUPATIONAL ORIENTATION FOR THE DEVELOPMENTALLY DISABLED (5).** Pr., junior standing. Principles for providing occupational orientation and work experience techniques of curriculum planning, job classification and evaluation, selection, and placement, curricular activities related to work experience, community agencies and public relations.
538. **WORK ADJUSTMENT IN REHABILITATION (5).** Pr., junior standing. 10 hrs. Psychology, 10 hrs. Rehab. Introduction to the history, development, theoretical base, and techniques of work adjustment in rehabilitation.
540. **INTRODUCTION TO MANUAL COMMUNICATION WITH THE DEAF (4).**
541. **AMERICAN SIGN LANGUAGE (4).** Pr., COI.
542. **SURVEY REHABILITATION WITH THE BLIND AND VISUALLY HANDICAPPED (4).**
543. **VOCATIONAL EVALUATION AND ADJUSTMENT OF BLIND AND VISUALLY HANDICAPPED (4).**
544. **SURVEY OF REHABILITATION WITH DEAF AND HEARING IMPAIRED (4).**

546. **VOCATIONAL EVALUATION OF DEAF AND HEARING IMPAIRED (4).**
549. **SYSTEMS OF VOCATIONAL EVALUATION FOR THE RETARDED (3).** LEC. 1, LAB. 4. Pr., RSE 535, junior standing. Instruction and supervised practice in the development, evaluation, and application of commercial systems of vocational evaluation for use with the mentally retarded.
550. **LANGUAGE DEVELOPMENT FOR THE YOUNG HANDICAPPED CHILD (5).** Pr., junior standing and COI. A systematic approach to intervention programming for communication development with handicapped children.
- 556.** **LEARNING RESOURCES IN AREA OF SPECIALIZATION (4).** Pr., junior standing.
580. **EDUCATION OF CHILDREN WITH SPECIAL LEARNING DISABILITIES (5).** Pr., RSE 375 or 376, 529, junior standing and COI. Existing theories and instructional programs for children with special learning disabilities. Administrative arrangements, classroom management, individual educational evaluation and programming are emphasized.
585. **THE MODERATELY MENTALLY RETARDED (3).** The child functioning in the moderate mental retardation range with emphasis upon the implications for the education and training for this population.
586. **THE SEVERELY MULTIPLY HANDICAPPED (3).** Children and youth functioning at the severe or profound mental retardation level with concomitant problems, such as behavior, sensory and physical handicaps. Emphasis will be on identification and educational programming.
587. **PARENT EDUCATION FOR HANDICAPPED CHILDREN (4).** Pr., RSE 375 or 376. Provides students with an understanding of the concerns of families with handicapped children and program options and techniques for effective communication with family members.
588. **EDUCATIONAL APPROACHES WITH HANDICAPPED INFANTS AND TODDLERS (4).** Pr., 375 or 376. Provides students with an understanding of the developmental stages in infancy through two years, activities appropriate at each stage and techniques for stimulating the child who is not developing at the normal rate.

GRADUATE

600. **ADVANCED STUDY OF EXCEPTIONALITY (5).** Pr., appropriate undergraduate preparation in Special Education or COI. An advanced study of the several types of exceptionality with an emphasis upon the educational and training implications of each.
601. **ADVANCED STUDY OF EDUCATIONAL ASPECTS OF MENTAL RETARDATION (5).** Pr., RSE 375 or 376, or 600, or COI. An advanced study of mental retardation as a special area of exceptionality with emphasis upon the education and training needs of the retarded.
602. **EDUCATIONAL DIAGNOSIS AND ASSESSMENT FOR SPECIAL LEARNING PROBLEMS (5).** Pr., RSE 375 or 376 and FED 661. A comprehensive study of tests and procedures for diagnosing special learning problems. In-depth instruction in educational assessment in such areas as perceptual-motor, language, academic aptitude, and achievement.
603. **PRESCRIPTIVE TEACHING FOR SPECIAL LEARNING PROBLEMS (5).** Pr., RSE 375 or 376, 602 and FED 661. In-depth instruction in specialized methods of prescriptive program planning based on educational assessments of children with learning problems. Development and presentation tasks are included.
605. **INTRODUCTION TO EDUCATION OF THE GIFTED AND TALENTED (4).** Provides opportunities for students to develop knowledge about the field of gifted education and awareness of the nature and needs of high ability children.
610. **INTRODUCTION TO REHABILITATION PROGRAMS, PROFESSIONS, AND SERVICES (2).** History, parameters, career opportunities, and issues in vocational rehabilitation and roles of various professions.
620. **SURVEY OF MILD HANDICAPS (5).** Pr., RSE 375 or 376 or 600 or COI. Provides information concerning the nature, needs, academic difficulties and factors to be considered in providing special education programs for children with mild learning handicaps.
621. **SURVEY OF MILD BEHAVIORAL HANDICAPS (5).** Pr., RSE 375 or 376 or 600 or COI. Provides information concerning the behavioral/social characteristics often associated with children who have mild learning handicaps.
622. **IMPLEMENTING INDIRECT SERVICE PROGRAMS FOR EXCEPTIONAL CHILDREN (5).** Pr., RSE 620 or 621 or COI. Provides graduate students with knowledge and skills necessary to insure that handicapped children will effectively transfer to the regular class and home environments skills learned in special education settings. Emphasis is placed on development of consultation skills.
623. **DIRECTING THE PERFORMANCE OF HANDICAPPED STUDENTS (5).** Pr., RSE 620 or 621 or COI. Prepares special educators to direct the academic and social performance of students who are classified as being Mildly Learning Handicapped.
- 625.** **INTERNSHIP (5-15).** Provides advanced students with supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences will be accompanied by regularly scheduled on-campus discussion periods designed to provide positive evaluation and analysis of the intern experience.
630. **DIAGNOSTIC VOCATIONAL EVALUATION (4).** Pr., PG 515 or equivalent. Process, principles, and techniques used to diagnose general assets and liabilities of the individual. Includes the functional and analysis of biographical data and the use of the evaluation interview. Emphasis is placed upon the rationale underlying the selection and use of psychometric tests in vocational evaluation.
631. **PROGNOSTIC VOCATIONAL EVALUATION (4).** Pr., RSE 630 or permission of department head. Process, principles, and techniques used to determine and predict work behavior and vocational potential. Includes the rationale underlying the selection and use of occupational exploration programs, work samples, situational tasks, simulated work experiences, and job tryouts in vocational evaluation.
632. **USE OF INTERPRETATION OF VOCATIONAL EVALUATION DATA (4).** Pr., RSE 630 and 631 or COI. Process, principles, and techniques used in the interpretation of vocational evaluation data to clients, to rehabilitation personnel, and to facility staff. Focuses upon the interpretation of data through the formal staff conference, vocational counseling, report writing, and follow-up.

634. **WORK SAMPLE DEVELOPMENT (5).** Pr., COI. Theoretical and technical principles related to the development, standardization and validation of work samples. Supervised experience in the application of work sample development principles.
643. **EDUCATION OF THE PHYSICALLY HANDICAPPED (5).** Pr., adequate courses in physiology and psychology and COI. The characteristics of major physical disabilities; the psychology of the physically handicapped; the educational objectives and curriculum adaptations; and related aspects of a total program for the physically handicapped.
644. **COMMUNICATION SYSTEMS FOR NONVERBAL HANDICAPPED CHILDREN (5).** LEC. 4, LAB. 2. Pr., RSE 375 or 376 or 600, or COI. Provides students with a knowledge and experience base necessary for developing, implementing, and evaluating individualized communication skill training programs for severely/profoundly handicapped children who are nonverbal.
- 646.** **DIRECTED INDEPENDENT STUDY (1-6).** Special study in which the student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student at regular intervals.
649. **TEACHING STUDENTS WITH SEVERE AND PROFOUND MENTAL RETARDATION (5).** Pr., RSE 375 or 376 or 600 or COI. The characteristics and educational needs of students functioning in the severe and profound range of mental retardation. Emphasis is placed on the development and application of assessment and programming skills with this population.
- 650.** **SEMINAR IN AREAS OF SPECIALIZATION (3-10).** May be repeated for credit not to exceed 10 hours. Provides an opportunity for advanced graduate students and professors to pursue cooperatively selected concepts and theoretical formulations.
- 651.** **RESEARCH STUDIES IN EDUCATION IN AREAS OF SPECIALIZATION (5).** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
- 652.** **CURRICULUM AND TEACHING IN AREAS OF SPECIALIZATION (5).** Teaching practices and reappraisal of selecting experiences and content for curriculum improvement.
- 653.** **ORGANIZATION OF PROGRAM IN AREAS OF SPECIALIZATION (5).** Program, organization, and development of basic and supplementary materials for guiding teachers, faculties, and school systems in the continuous improvement of curriculum and teaching practices.
654. **EVALUATION OF PROGRAM IN AREAS OF SPECIALIZATION (5).** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human and material resources and the coordination of areas of specialization.
670. **EDUCATIONAL PROCEDURES FOR CHILDREN WITH BEHAVIOR DISORDERS (5).** Pr., graduate standing and COI. Analysis of current provision for children with emotional conflicts, with emphasis on educational procedures and implications for learning disabilities.
- 695.** **PRACTICUM (1-15).** Provides advanced students with experiences closely relating theory and practice, usually carried on simultaneously.
- 696.** **GRADUATE RESEARCH FORUM (1).** May be repeated, but counted only once toward graduation. Presentations by graduate students of research proposals and/or findings. Analysis of procedures and findings.
- 699.** **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 798.** **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
- 799.** **RESEARCH AND DISSERTATION. (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

*Offered only to participants in training programs for workshops and facility personnel in State and Regional offices of Vocational Rehabilitation.

Religion (RL)

Professor Penaskovic, *Head*
 Assistant Professor Dawsey
 Adjunct Professor Nutt

201. **INTRODUCTION TO RELIGION (3).** Major themes in religion, including religious experience, religion and society, and the diversity of religion. Examples from various religious traditions.
210. **INTRODUCTION TO THE OLD TESTAMENT (5).** Historical-critical study of the Old Testament in its cultural setting. Emphasis on development of Old Testament thought.
211. **INTRODUCTION TO OLD TESTAMENT BOOKS OF THE LAW (3).** Historical-critical study of the books of Law in the Old Testament.
212. **INTRODUCTION TO THE OLD TESTAMENT PROPHETS (3).** Emphasis on books of the prophets in Old Testament.
220. **INTRODUCTION TO THE NEW TESTAMENT (5).** Historical-critical study of the New Testament in its cultural setting. Major issues in New Testament study.
221. **INTRODUCTION TO NARRATIVE BOOKS OF THE NEW TESTAMENT (3).** Historical-critical study of the gospels and book of Acts in their cultural setting.
222. **INTRODUCTION TO THE EPISTLES OF THE NEW TESTAMENT (3).** Historical-critical study of the Epistles in the New Testament.

- 230. **HISTORY OF CHRISTIANITY (3).** Development of Christianity from 100 A.D. to the present. Major personalities, events and movements.
- 245. **THE CURRENT RELIGIOUS SCENE (5).** Religious themes and developments in contemporary American life.
- 250. **INTRODUCTION TO SPIRITUALITY (4).** Spiritual growth and development in the context of the major world religions.
- 300. **THE FIRST CHRISTIANS (3).** Literature, thought and practices of earliest Christianity.
- 301. **WORLD RELIGIONS (5).** Hinduism, Buddhism, Taoism, Confucianism, and Islam, with secondary attention to other Asian religions.
- 320. **JESUS (5).** Pr., RL 220 or 221. Jesus as portrayed in the New Testament and subsequent interpretations.
- 325. **PAUL (5).** Pr., RL 220 or 222. Life, letters and thought of the Apostle Paul.
- 340. **RELIGION IN AMERICA (5).** Religious activities, institutions and personalities in North America from the Colonial Period to the present.
- 350. **TWENTIETH CENTURY RELIGIOUS THOUGHT (5).** Pr., one course in religion. Major twentieth century theologians — Protestant, Catholic, Jewish.
- 450. **SEMINAR (3-5).** Pr., RL 201. An intensive examination of a major topic in religious studies.
- 490. **READINGS IN RELIGION (3-5).** Pr., junior standing and COI. A program of independent study on a special topic. May be repeated for credit.

Sociology (SY), Anthropology (ANT), and Social Work (SW)

Professors Mohan, Starr and Stack
Associate Professors Adams, Head, Busch, Cottier,
Fauple, French, Gundlach, Kowalski, Popple, and Wilke
Assistant Professor Parker
Instructors Meyers and Pike
Joint appointees: Professors Dunkelberger and Molnar

SOCIOLOGY (SY)

- 201. **INTRODUCTION TO SOCIOLOGY (5).** Principles and processes of society. Open to Freshmen.
- 202. **SOCIAL PROBLEMS (5).** Pr., SY 201. A sociological analysis of current social problems such as crime, mental illness, race relations, poverty, aging, etc.
- 203. **POPULATION AND SOCIETY (5).** A survey of theories and research on how the demographic processes interact with such social institutions as the economy, education, family, medicine, science, and technology.
- 204. **SOCIAL BEHAVIOR (5).** Pr., SY 201 or PG 211. Integrated social psychological factors which influence or determine human behavior; the emphasis is upon the normal individual and/or group situations.
- 220. **STATISTICS (5).** Pr., SY 201. Basic statistical concepts, measures, and techniques used in sociological reports and research.
- 301. **SOCIOLOGY OF THE FAMILY (5).** Pr., SY 201. The American Family in perspective. Theory and method in sociological studies of the family.
- 304. **MINORITY GROUPS (5).** Pr., junior standing. Racial composition of the United States with special emphasis on the adjustment of minority groups to the core society.
- 350. **SOCIOLOGY COLLOQUIUM (1).** Pr., SY 201. Designed to orient sociology majors toward major substantive fields of the discipline. May be repeated for maximum of 3 credit hours.
- 360. **INTRODUCTION TO SOCIAL EPIDEMIOLOGY (5).** Pr., SY 201. The influence of social conditions and demographic characteristics upon health and well-being, emphasizing social aspects of major diseases and other problems such as mental disorders, suicide, homicide, divorce, and family violence.
- 370. **METHODS OF SOCIAL RESEARCH (5).** Pr., SY 201 or RSY 361. The principal methods of data collection and analysis in sociological research. Same as RSY 370. Credit in RSY 370 precludes credit in SY 370.
- 409. **SOCIAL THOUGHT (5).** Pr., SY 201 or COI. Focus on pre-Comtian ideas bearing on the definition and emergence of social and behavioral theory.
- 411. **SOCIAL CHANGE (5).** Pr., SY 201 or COI. Major theoretical and research perspectives in social and developmental change.
- 477. **SOCIOLOGY OF AGING (3).** Pr., SY 201. A social-cultural treatment of the phenomena of aging emphasizing recent theory and research.
- 478. **SEMINAR IN SOCIOLOGY OF LAW (3).** Pr., SY 201, junior standing. The structure and functioning of the American legal system analyzed with cross-cultural comparisons, and institutional interrelations examined. Case method approach is used.

ADVANCED UNDERGRADUATE AND GRADUATE

- 502. **SOCIAL THEORY (5).** Pr., SY 201 or COI. Survey of theorists from Comte to the present; emphasizes theory construction, theoretical analysis, and differences in theoretical approaches.

504. **SOCIOLOGY OF POWER (5).** Pr., SY 201. A systematic concern with the dimensions and distribution of power in social life.
505. **URBAN SOCIOLOGY (5).** Growth and decline of cities with special emphasis on ecological and demographic characteristics, associations and institutions, class systems, and housing and city planning.
507. **PUBLIC OPINION AND PROPAGANDA AND MEDIA (5).** Pr., SY 201. A survey of social communication emphasizing the formation, use and assessment of publics, ideologies and opinions in mass society.
508. **INDUSTRIAL SOCIOLOGY (5).** Pr., SY 201. The sociological approach to business organization and industrial relations. Emphasis given to organization principles operative in the economic life within a social system such as a factory or business establishment.
509. **SOCIOLOGY OF RELIGION (5).** Pr., SY 201 or COI. Analysis of religion as a social institution as found in the world's great religions.
511. **THIRD WORLD DEVELOPMENT (3-5).** Pr., SY 201 or COI. Major theoretical perspectives and research accomplished concerning efforts to promote the social and economic development of the Third World countries.
514. **FIELD INSTRUCTION (1-10).** Pr., COI. Supplementary instruction concurrent with experience in some field of work involving application of sociological perspectives to community life. May be repeated for a maximum of 10 hours credit.
515. **SOCIAL STRATIFICATION (5).** Pr., SY 201. Stratification as a fundamental feature of all societies. Past thought and current research and theory on structured social inequalities is systematically developed.
518. **SOCIOLOGY OF OCCUPATIONS (5).** Pr., SY 201. A comprehensive examination of specific occupational categories ranging from professional to service occupations. Special emphasis is placed on the relationship of occupational structure and institutions and the meaning of occupations for individuals and society.
520. **RACIAL AND ETHNIC RELATIONS (5).** Pr., 10 hours of SY or COI. Utilizes cross-cultural data to describe situations in which race or ethnicity affect human behavior. These data interpreted by delineating patterns, trends, and relationships.
522. **SPECIAL TOPICS IN SOCIOLOGY (1-5).** Pr., SY 201 or COI. Examines selected topics from a sociological perspective. May be repeated for a maximum of 10 hours.
525. **SEMINAR IN SOCIAL DEVIANCE (5).** Pr., SY 201 or COI. Analysis of factors in the creation of and reaction to social deviance. Examines various theoretical approaches to deviance, with particular emphasis on how behavior comes to be defined as deviant.
534. **SOCIALIZATION (5).** Pr., SY 201. Examines an important and distinct sociological tradition: mind, self, society and interaction as symbolic phenomena grounded in social processes. Covers major intellectual influences, concepts, and figures (e.g., James, Mead, Cooley).
550. **DIRECTED READING (1-5).** Pr., COI. An independent reading program, under supervision, to provide for the pursuit of specific interests in sociology not covered by other course offerings. May be repeated for a maximum of 10 hours credit.
577. **SEMINAR IN MEDICAL SOCIOLOGY (5).** Pr., SY 201 or COI. The nature and organization of medical practice and health delivery systems. Special attention to role of physicians and various views of patients and disease. Relationship between culture, politics, and health.

GRADUATE

602. **SEMINAR IN THE FAMILY (5).** Pr., SY 301 or COI. Study of the institutions of marriage, family, and kinship from a comparative and historical perspective.
604. **SEMINAR IN RACE AND CULTURE (5).** Pr., SY 201 and 304 or COI. Adjustment of races to culture with particular reference to the South; the historical and cultural background of the races in America; bi-racial system; problems of race relations.
608. **ORGANIZATIONAL ANALYSIS (5).** A theoretical and empirical examination of the principal features of large-scale organizations in contemporary society. Directed research into particular organizational areas of present-day social life.
610. **SEMINAR IN SOCIAL BEHAVIOR (5).** Pr., SY 204, PG 330, or COI. Research and theory concerning social and group influences on behavior.
620. **ADVANCED SOCIOLOGICAL THEORY (5).** Pr., COI, SY 502. This course reviews principal types of sociological theory, exchange theory, and structural functionalism. It focuses on significant theoretical issues.
630. **STATISTICAL APPLICATIONS IN SOCIOLOGICAL RESEARCH (3-5).** Pr., SY 220 or COI. A general survey of uses and limitations of statistical techniques used in sociology.
650. **SOCIOLOGY SEMINAR (5).** Pr., COI. May be taken for a maximum of 15 hours. Designed for students engaged in intensive study and analysis of sociological subject areas. May be repeated for a maximum of 10 credit hours.
661. **SOCIOLOGY OF REGIONS (3).** Social and demographic phenomena having implication for regional planning and development with emphasis on Southern region and subregions. Intra- and inter-regional influences, sociocultural structure, value orientations, population, changes and trends, and metropolitanization.
680. **INDEPENDENT STUDY (1-5).** Under supervision, to read and study materials in some substantive area of sociology.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be repeated for credit.

RURAL SOCIOLOGY

For course descriptions, see Department of Agricultural Economics and Rural Sociology.

- 261. **INTRODUCTION TO RURAL SOCIOLOGY (5).** Credit not allowed in this course and SY 201.
- 362. **COMMUNITY ORGANIZATION (5).**
- 370. **METHODS OF SOCIAL RESEARCH (5).** Pr., RSY 261 or SY 201.
- 371. **APPLIED RESEARCH METHODS AND PROGRAM EVALUATION (3).** Credit not allowed in this and in RSY or SY 370.
- 499. **DIRECTED STUDIES IN RURAL SOCIOLOGY (1-5).** Pr., COI.
- 541. **EXTENSION PROGRAMS AND METHODS (5).**
- 561. **RURAL SOCIOLOGY (5).**
- 562. **SOCIOLOGY OF COMMUNITY DEVELOPMENT (5).**
- 565. **SOCIOLOGY OF NATURAL RESOURCES AND ENVIRONMENT (5).**
- 662. **SOCIOLOGY OF COMMUNITY (3).** (Same course as RSY 662.)
- 663. **POLITICAL ECONOMY OF DEVELOPMENT (5).**
- 670. **RESEARCH METHODS IN SOCIOLOGY (5).**

ANTHROPOLOGY (ANT)

- 203. **INTRODUCTION TO ANTHROPOLOGY (5).** Pr., sophomore standing. The anthropological perspective from the four major fields of anthropology: physical, cultural, archaeological, and linguistic.
- 206. **CULTURAL ANTHROPOLOGY (5).** Pr., ANT 203. The nature of culture. Comparative approach to the study of the principal institutions of human society and basic categories of human behavior.
- 207. **INTRODUCTORY ARCHAEOLOGY (5).** The history, principles, and methods for investigating and reconstructing past cultures.
- 303. **HISTORY OF ANTHROPOLOGICAL THEORY (5).** Pr., ANT 203. The development of ethnological theory.
- 305. **CULTURE AND PERSONALITY (3).** Pr., SY 201 or ANT 203. Socio-cultural factors in personality development and recent studies in national character.
- 306. **INTRODUCTION TO PHYSICAL ANTHROPOLOGY (5). LEC. 3, LAB. 3.** Pr., ANT 203. Human origins and development; contemporary primate varieties, using a genetic and anthropometric approach.
- 313. **STATUS OF WOMEN (5).** Pr., ANT 203 or SY 201. An anthropological and sociological analysis of the status of women in societies, the cultural belief systems involved and problems resulting from status change. (A Women's Studies Minor Course.)
- 314. **ANTHROPOLOGY OF WORK (3).** Pr., junior standing. Anthropological theory and data applied to problems of various work settings.
- 340. **ARCHAEOLOGICAL FIELD SCHOOL (5-10).** Pr., COI. A field methods course, in which archaeological site surveying, excavation and analysis procedures are taught with student participation in directed research projects at a selected archaeological site.
- 401. **KINSHIP, MARRIAGE AND THE FAMILY (5).** Pr., ANT 203 or SY 301. The comparative study of human patterns of marriage, child rearing, inheritance, descent and kinship.
- 403. **CONTEMPORARY ANTHROPOLOGY (5).** Pr., ANT 203, junior standing. Contemporary research and theory regarding primitive, traditional, and urban cultures.

ADVANCED UNDERGRADUATE AND GRADUATE

- 511. **LANGUAGE AND CULTURE (5).** The social basis of verbal communication; functions of language in society; importance of language in contemporary social problems.
- 512. **GENERAL ETHNOLOGY (5).** Surveys ethnological data from several societies in order to provide an understanding of the range and variability of cultural phenomena.
- 524. **SPECIAL TOPICS IN ANTHROPOLOGY (1-5).** Pr., ANT 203 or COI. Examines selected topics from an anthropological perspective. May be repeated for a maximum of 10 hours.
- 531. **SOUTHEASTERN ARCHAEOLOGY (5).** Pr., ANT 207. A survey of the findings of archaeologists working southeastern North America, detailing the diversity and complexity of prehistoric Indian cultures in the region.
- 532. **INDIANS OF NORTH AMERICA (5).** Aboriginal cultures of North America. Effects of culture contact. Contemporary problems of Indian communities.
- 534. **MESOAMERICAN ARCHAEOLOGY (5).** Pr., ANT 207. A survey of the prehistoric cultures of Mexico and Central America, with particular emphasis on the Olmec, Toltec, Maya and Aztec cultures.
- 540. **HISTORICAL ARCHAEOLOGY AND ETHNOHISTORY (5).** Pr., COI. A review of the methods and findings of these two subfields, with emphasis on anthropological approaches to the past culture and history of peoples who left few written records: slaves, Indians, lower classes.

550. **DIRECTED READING (1-5).** Pr., COI and junior standing. An independent reading program, under supervision, to provide for the pursuit of specific interests in anthropology not covered by other course offerings. Can be repeated for a maximum of 10 hours credit.
612. **SPECIAL TOPICS IN ETHNOLOGY (5).** Pr., COI. An intensive study of peoples and cultures from a particular geographical area of cultural adaptation.

CRIMINOLOGY (SCR)

302. **CRIMINOLOGY (5).** Pr., SY 201, junior standing. The causes of crime and its social treatment.
308. **JUVENILE DELINQUENCY (5).** Pr., SY 201. Historical and contemporary considerations relative to the juvenile offender. The emphasis is upon research data from the various sciences attempting to deal with the problem.
415. **JUVENILE JUSTICE (5).** Pr., SY 201 or COI. Analysis of the juvenile justice system with special emphasis on some of the unique issues and problems that are involved in the adjudication and rehabilitation of juvenile offenders. Credit for PO 415 precludes credit for SCR 415.
420. **PROBATION AND PAROLE (5).** Pr., SY 201 or COI. An introduction to the fields of probation and parole. Following a brief discussion of the historical development, the course will attempt to acquaint students with current theories, practices, organizational goals and problems with both adult and juvenile probation and parole programs.
426. **PENOLOGY (5).** Pr., SY 201 or COI. The history and development of corrections with particular emphasis upon modern rehabilitative processes.
450. **SOCIOLOGY OF CRIMINAL LAW (5).** Pr., SY 201 or COI. Examines how and under what conditions behavior comes to be defined as criminal and how legal codes interact with other normative systems in society.
501. **DRUGS AND SOCIETY (5).** Pr., SCR 302 or SCR 308, junior standing. Emphasizes the social context and correlates of drug usage, relationship with crime and delinquency, the nature of societal reaction, and pertinent sociological theories concerning drug related behavior.
514. **FIELD INSTRUCTION IN CRIMINOLOGY (1-10).** Pr., COI. Supplementary instruction concurrent with experience in some field of work related to Criminology. May be repeated for a maximum of ten hours credit.
530. **CONTEMPORARY CORRECTIONS (5).** Pr., SCR 302 or 426 or COI and junior standing. Examination of current adult correctional programs and practices. Emphasis on community corrections.
555. **DIRECTED READINGS IN CRIMINOLOGY (Variable Credit.)** Pr., COI. An independent reading program, under supervision, to provide for the pursuit of specific interests in criminology not covered by other course offerings. May be repeated for a maximum of 10 hours credit.

SOCIAL WORK (SW)

320. **SOCIAL WORK FIELD PRACTICUM (1-5)** Pr., COI. An introduction to the fields, methods, and settings of social work practice through an internship in a selected social work setting. This course stresses a basic understanding of social service organizations. Students work under the joint supervision of the placement agency and the university. A seminar is held regularly to evaluate, discuss and interpret the student's work. Social Work majors must earn 4 hours credit. May be taken by any major for a maximum of 5 hours credit.
375. **INTRODUCTION TO SOCIAL WELFARE (5).** Pr., sophomore standing. The development of U.S. social welfare programs, policies, and services. Emphasizes political, economic, and social factors involved. Introduction to health and welfare services of local community.
376. **COMMUNITY SOCIAL SERVICES (5).** A review of the social services available in a typical community in areas of health, income, housing, crises, child welfare, legal and mental health. Addresses procedures in linking clients with services and work with blacks, the aged, families, and groups.
377. **CHILD WELFARE (5).** Reviews practice in child abuse and neglect, foster care, child care and adoptions. Addresses work with blacks, court procedures, and worker stress. Opportunity for experience.
380. **FOUNDATIONS OF SOCIAL WORK (5).** Pr., SY 201. The integration of social science perspectives for the social work student. Surveys interpretations of biological, socio-psychological, and cultural determinants of behavior for social work practice.
385. **AGING ISSUES AND SERVICES (2-5).** Pr., SY 201, SW 375, or COI. Reviews social services and social work with elderly, and issues in economics, religion, health, mental health, politics, mass media education, biology, housing, nutrition, and recreation. Field work option.
420. **SOCIAL WORK FIELD PLACEMENT (1-15).** Pr., SW 508, and COI. A planned field experience in which the student is placed in a community service agency, working under the joint supervision of the agency and the University. A seminar is held regularly to evaluate, discuss, and interpret the student's work.
426. **SPECIAL TOPICS IN SOCIAL WORK (1-5).** Pr., SY 201 or COI, junior standing. Examines selected topics from a social work perspective. May be repeated for a maximum of 10 hours credit.

ADVANCED UNDERGRADUATE AND GRADUATE

506. **SOCIAL WORK METHODS I (5).** Pr., SW 375, SW 380 and admission to social work program or COI. The first in a sequence of social work practice method courses focusing on the application of knowledge value and skill in carrying out a problem-solving, systems oriented approach with clients at the individual, small group, organization and community level. Emphasis on application of research, process of social change, non-judgmental practitioner stance and regard for cultural, racial, age and lifestyle variations.
507. **SOCIAL WORK METHODS II (5).** Pr., SW 376, 506. Continuation of SW 506.
508. **SOCIAL WORK METHODS III (3).** Pr., SW 507. Continuation of SW 507.

575. **SOCIAL WELFARE POLICY (5).** Pr., SW 375 or COI. Current problems, policy issues, and proposals in selected social welfare programs are critically examined and evaluated.

Speech Communication (SC)

Professors Richardson, Head, Barker, Bradley, Overstreet, and Solomon
Associate Professor Fitch-Hauser
Assistant Professors Brown, Hennen, Plasketes, Villaume, and Padgett
Instructors Bricker, Dudchock, and White

COMMUNICATION THEORY/RHETORIC AND PUBLIC ADDRESS

100. **PROFESSIONAL COMMUNICATION (5).** Oral communication theory and practice in interviewing, oral reporting, public speaking with emphasis on content, organization, delivery and adaption to the audience.
141. **GROUP PROBLEM SOLVING THROUGH DISCUSSION (5).** Group problem solving through discussion. The values and limitations of discussion, the prerequisites of reaching agreement, and a systematic approach to solving problems in group discussion. Leadership in problem solving.
171. **PARLIAMENTARY PROCEDURE (1).** To aid the individual who may lead or participate in discussions or organizations where orderly procedure is needed. Theory and practice both employed.
230. **FOUNDATIONS OF MASS COMMUNICATIONS (5).** The history and bases of mass communication in the U.S., emphasizing the social, cultural, regulatory, and economic aspects of the American mass communication system.
235. **MODES OF FILM COMMUNICATION (5).** The film industry's contribution to television and other forms of mass communication; an analysis of the styles and forms of film production as entertainment, communication, education and art.
250. **FOUNDATIONS OF HUMAN COMMUNICATION (5).** The nature, purposes, and process of communication. Theories examining the use of verbal and nonverbal codes, the influence of context, and the effects of messages in a variety of settings.
260. **FOUNDATIONS OF RHETORIC AND SOCIAL INFLUENCE (5).** Examines the impact of discourse in public discussion of social and political issues; traces the development of rhetorical theory from its classical roots to contributions by modern thinkers; relates rhetorical theory and analysis to understanding of the persuasive discourse in our society.
304. **INTRODUCTION TO PUBLIC RELATIONS (5).** Pr., JM 101. The broad spectrum of the field of public relations. The various communication skills and technologies necessary for successful public relations will be identified and explored. Credit for this course precludes credit for JM 204.
311. **PERSUASIVE DISCOURSE (5).** Pr., SC 111 or COI. Understanding, practicing, and analyzing persuasion. Survey of alternative theoretical approaches to attitude formation and change. Practical experience in organizing and presenting persuasive messages. Developing skills as a critical evaluator of persuasion in natural settings.
320. **FUNDAMENTALS OF ORAL INTERPRETATION OF LITERATURE (5).** Oral readings of prose, poetry and drama, enhancing the student's understanding and appreciation of the art of literature by engaging him actively in reading, the literary text aloud.
330. **INTRODUCTION TO BROADCAST PRODUCTION (5).** Pr., SC 230. Basic principles of single channel audio production, television studio production, and television post-production techniques.
334. **RADIO PRODUCTION TECHNIQUES I (5).** Pr., COI. Analysis of the creative efforts and responsibilities in the primary stages of broadcast production. Practice in writing, producing, directing, performing, and crewing radio productions and taped material.
335. **WRITING FOR RADIO—TELEVISION—FILM (5).** Pr., COI. The technique of writing dramatic and non-dramatic material for television, radio, and films. Special emphasis is placed on performance. Students may elect to emphasize one area.
336. **TELEVISION PRODUCTION — DIRECTION I (5).** Pr., COI. Individual and group projects in the development and production of programs and formats; an intense study of directing theory and the director's role through presentation of educational and dramatic materials.
337. **ELECTRONIC FIELD PRODUCTION (5).** Pr., COI. The principles and techniques of video tape production with emphasis on portable and remote equipment. The course includes the production and direction of electronic news gathering projects along with the scripting of various creative field assignments.
338. **BROADCAST NEWS WRITING (5).** Pr., COI. Writing and editing news and informational materials for television and radio. Students solicit and prepare news from and for local sources.
340. **COMMUNICATION IN ORGANIZATIONS (5).** Focuses on prevalent communication skills in complex human organizations. Students participate in a variety of communication-related activities including interviewing, the development of a consulting prospectus, and presentational speaking. Theoretical considerations for each performance area are stressed.
370. **ARGUMENTATIVE DISCOURSE (5).** Debating techniques and procedures; their application to issues of current public interest; the gathering, organization, and presentation of facts, proofs, evidence.
375. **DEBATE WORKSHOP (1).** Advanced national debate question for experienced debaters. Analysis of logical, emotional proofs in competitive debate. Lecture and practical work. May be repeated for a maximum of 3 credit hours.
400. **HONORS THESES (3-6).** Pr., senior standing and enrollment in the Honors Program. Repeatable once for a maximum of 6 hours credit.

402. **PUBLIC RELATIONS CAMPAIGNS (5).** Investigates selected professional code of ethics and considers appropriate ethical principles for PR practitioners. Also focuses on applying ethical standards to planning campaigns for various target publics.
404. **PUBLIC RELATIONS CASE STUDIES (5).** Pr., SC 304, or JM 204, or COI. Investigation and analysis of public relations problems through case studies. Credit for this course precludes credit for JM 404.
408. **PUBLIC RELATIONS WRITING AND RESEARCH (5).** Pr., SC 451. Focuses on methods of gathering and reporting information used in various PR messages examines research techniques and instruments used in public relations.
410. **COMMUNICATION STRATEGIES OF SOCIAL MOVEMENTS (5).** An examination of the communication techniques of contemporary social movements to attract members, solidify support and effect social change. Topics to be covered include: stages of development of movements; issues, persuasive strategies and stylistic devices of representative groups; and, nature and impact of social movements.
420. **ORAL INTERPRETATION OF PROSE (5).** Pr., SC 320 or COI. Develops skill in the oral reading of creative prose. Theories concerning the sound, sense, and performance of prose.
421. **ORAL INTERPRETATION OF POETRY (5).** Pr., SC 320 or COI. Theories concerning problems in reading verse, criticism and performance; modes of group performance are included.
422. **READERS THEATER (5).** Pr., SC 320 or COI. Investigates literature appropriate to group performance and treats the techniques of adaptation, compilation, rehearsal and staging of non-dramatic literature.
430. **RADIO/TELEVISION PROGRAMMING STRATEGIES (5).** Pr., SC 230. Introduces students to the principles, processes, theories, and strategies of programming for radio and television stations and for cable television systems. An introduction to interpreting broadcast ratings.
431. **THE SOCIAL INFLUENCE OF MASS MEDIA (5).** Functions and effects of mass communication on contemporary social norms and values. The impact of the media on the level of violence and aggressive behavior; the nature of the political process; and individual attitudes and behavior.
432. **BROADCAST MANAGEMENT (5).** Investigates principles and practices of managing broadcasting stations and cable operations.
433. **MEDIA, LAW AND REGULATION (5).** Examines legal, professional, and ethical constraints on the mass media.
434. **AUDIENCE RESEARCH (5).** Examines broadcast market and audience research methodologies; the application of research to programming and sales; and the broadcast audience ratings companies.
436. **CINEMA AND SOCIETY (5).** Pr., SC 235 or COI. The role of film, its history, contributions and effectiveness as an area of expression and communication; an analysis of the social, artistic, economic and cultural factors which have influenced the film.
439. **INTERNSHIP (3 or 6).** Pr., departmental permission and junior standing. S-U grading only. Credit toward requirements for major may not be granted for both SC 439 and SC 431-432.
441. **THEORIES OF LEADERSHIP (5).** Emphasizes theory and research in leadership as a communication variable and behavioral practice in small group and organizational settings. Students participate in numerous leadership simulations.
450. **PSYCHOLOGY OF COMMUNICATION (5).** Pr., one course in psychology. Speech as a psychological phenomenon with consideration of language development; symbolism; verbal learning. Small groups and audience behavior and psychological studies in various areas of communication situations.
451. **SURVEY RESEARCH METHODS IN MASS COMMUNICATION (5).** Theory and practical experience in methods of survey research in mass media and public relations. Sampling techniques, interview strategies, questionnaire development, and data analysis.
470. **LEGAL COMMUNICATION (5).** Three communication subjects of significance to the legal profession are treated; the initial lawyer/client interview, legal negotiation, and trial practice. The theory and research base of these three topics will be investigated, and practicum exercises will assist student development of needed skills.
480. **INTERPERSONAL COMMUNICATION (5).** An analysis and comparison of several approaches to the study of current problems in interpersonal behavior and relational communication. Topics will include: contexts of varying person perception; interpersonal attraction; and how person perception is related to behavior.
481. **NONVERBAL COMMUNICATION (5).** Research and theory in several areas of non-verbal communication including kinesics, proxemics, paralinguistics, environment, and personal appearance.
490. **SPECIAL TOPICS IN SPEECH COMMUNICATION (1-5).** Examines selected topics in Speech Communication. May be repeated; only 5 hours applicable to the major.

ADVANCED UNDERGRADUATE AND GRADUATE

512. **COMPUTER APPLICATIONS TO COMMUNICATION THEORY AND RESEARCH (5).** Applies computer simulation techniques to the process of message construction, diffusion of information, small group interaction and organizational network analyses. Course also utilizes statistical packages in the testing of the communication dependent hypotheses.
534. **RADIO PRODUCTION TECHNIQUES II (5).** Pr., SC 334 or COI. A continuation of SC 334 with further refining of writing, producing, directing, performing and crewing radio productions and audio taped material.
536. **TELEVISION PRODUCTION — DIRECTION II (5).** Pr., SC 336. Individual and group projects in the creation of program material with special emphasis on the writer-producer and his role in the industry.

GRADUATE

601. **INTRODUCTION TO GRADUATE STUDY (5).** Consideration of the scope and nature of these types of research and their contribution to understanding human communication; discussion of the processes and procedure characteristic of these methodologies.
602. **EMPIRICAL APPROACHES TO COMMUNICATION (5).** Quantitative research in communication. Emphasis on understanding and doing empirical research.
603. **DEVELOPMENT OF RHETORICAL THEORY I (5).** Pr., COI. Historical study of the theories of persuasion from ancient to modern times. Special attention to the role of rhetoric in society and changing attitudes toward persuasion.
605. **PUBLIC RELATIONS THEORY (5).** Explores major areas of concern to the theoretical study of public relations. Includes: applied survey research; public relations with business, government, and non profit organizations; propaganda techniques and diffusion of information.
606. **SEMINAR: STUDIES IN COMMUNICATION THEORY (5).** Contemporary theories and analysis of concepts, models and pertinent research in interpersonal communication. Consideration of selected topics.
607. **INDEPENDENT STUDY (1-5).** Prior written approval required. Conferences, readings, research, and reports in one of the listed categories. May be repeated for a maximum of 5 hours credit.
608. **SEMINAR IN PERSUASION AND ATTITUDE CHANGE (5).** A critical examination of current theory and research in the area of the persuasive act and its effects. Particular attention to current departmental projects as examples of present research.
612. **EXPERIMENTAL METHODS IN COMMUNICATION (5).** A survey and analysis of experimental and empirical research in communication with emphasis on experimental designs.
613. **AMERICAN PUBLIC ADDRESS (5).** Criticism of selected speakers, and speeches, 1750-1860, studied against a background of political, social, and intellectual issues.
615. **RHETORICAL CRITICISM (5).** Pr., COI. Methods of analyzing persuasive messages of individuals, groups and movements. Application of these methods to selected works.
617. **GENDER COMMUNICATION (5).** Explores current research on and theories of gender as a communication variable. Topics include the role of gender in interpersonal, organizational, and public communication.
620. **DEVELOPMENT AND THEORY OF INTERPRETATION (5).** The growth and change of theories regarding oral interpretation.
621. **FROM NOVEL TO FILM TO PERFORMANCE (5).** Course concerns itself with four or five 20th century novels and the films made from them and includes performances from the novels.
623. **PROBLEMS IN GROUP PERFORMANCE (5).** Focuses on special problems of analysis and adaptation of literature for performance by groups.
626. **INTERPERSONAL COMMUNICATION THEORY (5).** Theory and research in the process and effects of Interpersonal communication.
630. **STUDIES IN MASS COMMUNICATION (5).** Pr., COI. Combined media and their relationship with speech and communication.
632. **BROADCAST PROGRAMMING AND CRITICISM (5).** Pr., COI. The theory and practice of programming, its problems and concepts, coupled with an analysis of the criticism leveled at the process and the product.
633. **BROADCAST REGULATIONS (5).** The social and political control of broadcasting by agencies, groups, and organizations through legal, social, and economic means.
634. **COMPARATIVE MASS MEDIA SYSTEMS (5).** Investigates world broadcasting systems, international telecommunication policy and problems associated with broadcast signals that transcend national boundaries.
635. **MASS COMMUNICATION IN THEORY AND SOCIAL IMPACT (5).** Explores major areas of concern to the theoretical study of mass communication and the social impact of mediated messages.
636. **MASS MEDIA AND THE POLITICAL SYSTEM (5).** Provides students an examination of the role of the mass communication system in the American political system.
637. **ROLE AND INFLUENCE OF MASS MEDIA IN SOCIETY (5).** Examines nature of mass media, their function in society, and their impact on social processes, public decision, and private lives.
651. **SEMINAR IN INTRAPERSONAL PERSPECTIVES (5).** Looks at communication from a receiver orientation, focusing on how human beings receive, store, and recall information.
672. **SEMINAR IN SMALL GROUP COMMUNICATION (5).** Principles of human communication as they apply to the small group setting. Processes associated with group decision-making.
673. **SEMINAR IN GROUP AND ORGANIZATIONAL COMMUNICATION (5).** Group decision-making within an organizational setting. How groups effect change within functioning organizations. Processes associated with the diffusion of innovations.
678. **SEMINAR IN ARGUMENTATION AND DEBATE (5).** Systems of argumentation as inquiry and advocacy; studies of debate as a decision making procedure; representative argumentation theorists and leading practitioners.
698. **SEMINAR IN SPEECH COMMUNICATION (5).** Advanced treatment of contemporary topics and trends as well as current research findings and opportunities. May be repeated for credit with change in topics.
699. **THESIS (CREDIT TO BE ARRANGED.)**

Textile Engineering (TT, TC, TE and TMT)

Professors Hall, Lynch, Perkins, Acting Head and Smith
Associate Professors Broughton, Reed, and Walker
Assistant Professor El-Mogahzy
Adjunct Professor Teague

General Curriculum, GC, students (those with undeclared majors) may enroll only with departmental consent.

DEPARTMENTAL COURSES (TT)

- 204. **COMPUTERS IN TEXTILES (3).** LEC. 2, LAB. 2. Pr., TT 211, TT 221 and IE 102. Instruction for Textile Engineering applications using micro, mini, and mainframe computer resources.
- 211. **YARN FORMING SYSTEMS (5)** LEC. 4, LAB. 3. Pr., TE 102. Forming of staple and filament yarns. Interactions between raw materials and manufacturing systems that create specified product characteristics.
- 221. **FABRIC FORMING SYSTEMS (5).** LEC. 4, LAB. 2. Pr., TE 102. The basic forming systems for textile fabrics including knit, woven and non-woven structures.
- 350. **TESTING OF TEXTILE MATERIALS (5).** LEC. 3, LAB. 4. Pr., TT 211 and TT 221. Basic principles of measuring the physical and chemical properties of natural and man-made textile materials; included supplementary laboratory experiments.
- 479. **HONORS THESIS (5).** Pr., senior standing. Individual student endeavor consisting of directed research and writing of honors thesis. (Honors Program students only. May be taken only once and may be substituted for TC 490.)

TEXTILE CHEMISTRY COURSES (TC)

- 441. **APPLIED DYEING THEORY (5).** Pr., TE 341. Dye fiber bonding; thermodynamics and kinetics of dyeing.
- 490. **UNDERGRADUATE RESEARCH I (5).** LEC. 2. Pr., senior standing. Initial quarter of an undergraduate research sequence.
- 491. **UNDERGRADUATE RESEARCH II (5).** Pr., TC 490 or TT 479. Conclusion of an undergraduate research sequence. (May be taken more than once with Department's consent.)

ADVANCED UNDERGRADUATE AND GRADUATE

- 560. **TEXTILES FINISHES (4).** Pr., TE 341, or COI. Textile finishing processes, machinery, and developing technology are covered. Both mechanical and chemical finishing are included. Emphasis is on the theory of application, the mechanism by which the finish works, and its effect on fabric properties.
- 641. **PHYSICAL CHEMISTRY OF DYEING (5).** Pr., TE 341 and CH 507 or COI. The laws of physical chemistry as applied to dye/fiber interactions. Thermodynamics and kinetics of dyeing systems.

TEXTILE ENGINEERING COURSES (TE)

- 102. **INTRODUCTION TO TEXTILE ENGINEERING (2).** LEC. 1, LAB. 3. An introduction to the application of engineering principles to textile systems and products. An introduction to the profession and on-site inspection of applications. (For Textile Engineering Department Majors only, credit in TMT 101 precludes credit in TE 102.)
- 340. **TEXTILE CHEMICAL PROCESSES I (5).** LEC. 4, LAB. 2. Pr., TE 431 and TE 432. Principles and Processes for bleaching, dyeing and finishing of textile yarns and fibers. Emphasis is on the coloration of textiles, the chemical principles of dyeing and finishing.
- 341. **TEXTILE CHEMICAL PROCESSES II (5).** LEC. 1, LAB. 2. Pr., TE 340. Continuation of TE 340 with emphasis on mechanical aspects of dyeing and finishing, quality control and process control.
- 355. **NUMERICAL METHODS AND COMPUTER APPLICATIONS (3).** Pr., MH 265 and TT 204. Use of digital computers to solve more computationally difficult textile engineering problems.
- 360. **MECHANICS OF FLEXIBLE STRUCTURES (5).** Pr., TE 102, MH 265. Analysis of mechanical behavior and physical properties of one and two dimensional flexible structures; such as fibers, yarns, and fabrics. The influence of geometrical structure and material properties on the mechanical properties of flexible structures will be undertaken.
- 362. **TEXTILE THERMODYNAMICS I (4).** Pr., MH 163, PS 222, TT 211, TT 221. An introduction to energy effects and applications of the first law and mechanical energy balances as applied to textile systems.
- 363. **TEXTILE THERMODYNAMICS II (4).** Pr., TE 362 and TT 204. A continuation of Textile Thermodynamics I to include steam and refrigeration cycles and more difficult first and second law applications to textile processes.
- 431. **STRUCTURE AND PROPERTY OF FIBERS (4).** Pr., CH 208. The use of a fiber depends on its properties and these properties in turn depend on the chemical structure and morphology of the fiber. These interrelationships between structure, property, and use are explored.
- 432. **FIBERS LABORATORY (2).** LAB. 6. Coreq., TE 431. A Fibers Laboratory to accompany TE 431 will include microscopic and chemical techniques of fiber identification and chemical and physical methods useful in the preparation and analysis of fibers.
- 456. **INSTRUMENTATION AND CONTROL (4).** LEC. 3, LAB. 2. Pr., TT 211, TT 221, EE 302. Fundamentals of laboratory analytical instruments and process instruments and controls.

490. **UNDERGRADUATE RESEARCH I (5). LEC. 2, Pr.,** senior standing. Initial quarter of an undergraduate research sequence.
491. **UNDERGRADUATE RESEARCH II (5). Pr.,** TE 490 or TT 479. Conclusion of undergraduate research sequence (May be taken more than once with Department's consent).
494. **SPECIAL PROBLEMS IN TEXTILE ENGINEERING (3). Pr.,** senior standing. Recent developments in textile materials and processes in the industry such as geotextiles, biomedical materials, distributed process control and energy management, fabric and yarn forming, dyeing and finishing operations.

ADVANCED UNDERGRADUATE AND GRADUATE

562. **ADVANCED MECHANICS OF FLEXIBLE STRUCTURES (3). Pr.,** TE 360 or COI. Advanced mechanical behavior of flexible structures, based on the geometrical parameters and properties of their constituent materials.

GRADUATE

609. **SPECIAL TOPICS (1-5). Pr.,** COI. Reading course designed with varying emphases to give student opportunity for broad overview in particular areas of textile technology. May be repeated for up to 15 hours credit.
631. **STRUCTURES AND PROPERTIES OF FIBERS AND POLYMERS (4). Pr.,** CH 208 or COI. An accelerated course covering the interrelationship between the structure and properties of apolymer and its uses and manufacturing techniques. Not open to students with credit in TE 431.
632. **POLYMERS LABORATORY (2). LAB. 2.** Laboratory exercises in synthesis, fabrication, and characterization of polymeric materials.
656. **DISTRIBUTED PROCESS CONTROL (5). LEC. 4, LAB. 2. Pr.,** COI. Applications of process control principles using analog and digital functions for multivariable control. Processes are configured on the Rosemount RMV-9000 distributed control system and real time simulations are conducted.
690. **GRADUATE PROJECTS (1-5). Pr.,** COI. Project course designed with varying emphasis to give student opportunity for indepth understanding in a particular area of textile technology. May be repeated for up to 15 hours credit.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** Required of all students seeking an advanced degree in Department.

TEXTILE MANAGEMENT AND TECHNOLOGY COURSES (TMT)

101. **SURVEY OF TEXTILE TECHNOLOGY (3).** An introduction to the manufacturing of textiles including fiber, yarn, fabric, coloration and finishing (credit in TE 102 precludes credit in TMT 101).
212. **SPECIAL TOPICS IN YARN MANUFACTURING (4). LEC. 3, LAB. 2. Pr.,** TT 211. An extension of 211. Mechanics of yarns, geometry and properties of yarns as influenced by processing techniques. Both conventional and non-conventional processes are explored.
231. **TEXTILE FIBERS I (5). LEC. 4, LAB. 2. Pr.,** CH 203. Natural and man-made fibers, their production, structure and properties. The relationship between polymeric fibrous materials, end products and utilization.
232. **TEXTILES FIBERS II (5). LEC. 4, LAB. 2. Pr.,** TMT 231. An extension of Textile Fibers I. Provides an in-depth analysis of physical and chemical structure and resulting properties of textile fibers. Application of fiber theory to practical manufacturing situations.
241. **DYEING AND FINISHING OF TEXTILE MATERIALS (5). LEC. 4, LAB. 2. Pr.,** CH 203; Coreq., CH 104. Emphasis on principles and techniques to modify textile materials by coloration, additives and surface treatment. The chemistry of these phenomena is studied.
242. **CHEMICAL TECHNOLOGY OF BLEACHING, DYEING AND FINISHING (3). LEC. 2, LAB. 2. Pr.,** TMT 241. Bleaching, dyeing and finishing of fabrics made from natural and man-made fibers; dyes and pigments for textiles, their chemical structure and utility.
311. **TEXTURIZED YARNS (2). Pr.,** TT 211 and TMT 231. Methods and principles of science applied to the modification of continuous multifilament textile yarns to alter their characteristics. Preparation of textured and non-textured yarns is presented.
320. **CONTROL OF FABRIC STRUCTURES (5). LEC. 4, LAB. 2. Pr.,** TT 221. The scope of capabilities including design and structure limitations of weaving, knitting and tufting systems is presented.
322. **NON-CONVENTIONAL FABRIC STRUCTURES (2). Pr.,** TT 221 and TMT 231. Methods of fabric forming other than conventional weaving or knitting are surveyed. More emphasis is placed on specific methods of greater economic significance.
325. **DESIGN OF TEXTILE FABRICS (4). LEC. 2, LAB. 4. Pr.,** TT 221. Technical fabric design drafts for woven and knit structures are studied. Patterns are developed on production machines. Problems of costs, material and personnel utilization as influenced by product design are presented.
342. **ANALYTICAL INSTRUMENTATION IN TEXTILES (3). LEC. 2, LAB. 2. Pr.,** TT 211, TT 221, and TMT 241. Use of specialized analytical instrumentation to assist in the production of textile products as means to solve problems of color mixing, waste water characterization, dust measurement and the identification of materials. Systems control by instrumentation is also included.
351. **ANALYSIS OF TEXTILE FABRIC STRUCTURES (5). LEC. 3, LAB. 4. Pr.,** TMT 320 and TMT 325. Analysis of textile fabrics, including woven, knit and non-conventional structures formed from the interfacings of primary materials. The student will make a technical, economic and manufacturing plan for the production of such materials.
352. **TEXTILE QUALITY CONTROL (3). Pr.,** MN 274 and TT 350. The practical application of quality control in the textile industry with emphasis on statistical control techniques. Areas covered included measures of variation, statistical quality control charts, sample size, confidence interval, significance testing, correlation, and analysis of variance.

480. **PLANT OPERATION AND COST CONTROL (4).** Pr., TMT 351. Establishing the criteria and implementation of modification of operations including a plant changeover. The technical requirements, constraints, use of assets and procedure to determine and control manufacturing costs are included.
482. **TEXTILE MANAGEMENT (3).** Pr., senior standing. A practical business management approach to the analysis and solution of problems in the textile industry. The major areas of concern to management are discussed, including policy determination, organization structure and analysis, employment, function, manpower development, financing purchasing, production, merchandising, industrial and public relations.
490. **UNDERGRADUATE RESEARCH I (5).** LEC. 2. Pr., senior standing. Initial quarter of an undergraduate research sequence.
491. **UNDERGRADUATE RESEARCH II (5).** Pr., TMT 490 or TT 479. Conclusion of an undergraduate research sequence. May be taken more than once with Department's consent.

Theatre (TH)

Professor Harrison

Associate Professors Garren, Head, Miller

Assistant Professors Denny, Lockrow, Schofield, Thudium, and Zuckerman

Instructor Robinson

100. **THEATRE CONVOCATION (0).** Required of all declared theatre majors during every quarter of residency. Workshops, critiques, performances, lectures, and discussions by faculty, students and visiting artists and scholars.
200. **INTRODUCTION TO ACTING AND DIRECTING (4).** Exploration of the basic principles and processes of acting and directing through lecture, discussion and concentrated laboratory work.
201. **INTRODUCTION TO THE THEATRE (3).** Appreciation of theatre arts including stage, television and film. Development of sensitivity and critical sophistication as articulate, discriminating theatregoers. Play and film viewing, play reading, critiques and term projects.
211. **VOICE FOR THE ACTOR I (2).** Pr., TH 200 or COI. Introduction to the mechanics and methods of voice production for the stage.
212. **ACTING I: FUNDAMENTALS (4).** Pr., TH 211 or COI. Exploration of basic performance techniques, utilizing improvisation, theatre games, and other exercises to develop creative awareness.
214. **STAGE MOVEMENT (3).** Pr., TH 200 or COI. Theory and practice in training the body to serve as a means of communication for the actor.
231. **THEATRE TECHNOLOGY I (4).** Principles and practice in the planning, drafting of work drawings, construction, painting, rigging, and shifting of stage scenery. Practical experience.
232. **THEATRE TECHNOLOGY II (4).** Pr., TH 231. Principles and practice of stage lighting technology, stage sound technology and the construction of hand, set, and dress properties for the stage.
233. **DRAFTING FOR THE THEATRE (4).** Pr., 231 or COI. A comprehensive study of the techniques and methods used in the graphic representation of stage scenery and properties.
240. **THEATRICAL DESIGN (4).** The elements of design used in the creation of theatrical space. Exploration of the fundamental visual design elements and materials with experimentation in their application to theatrical design. Practical utilization of design theory in various visual and theatrical design projects.
261. **COSTUME CONSTRUCTION (4).** The basic steps used in costume construction for the theatre from patterns through final ornamentation. Practical experience.
265. **STAGE MAKEUP (3).** Basic principles and practice of stage makeup and makeup design including facial painting and techniques of prosthesis.
271. **PLAY ANALYSIS (4).** Pr., 201 or COI. How to read a play with an examination of traditional and non-traditional scripts of various periods and genres.
281. **THEATRE PRODUCTION I (4-8).** Pr., consent of the department; offered summers only. Intensive study of theatre arts through participation in the AU Summer Repertory Theatre.
282. **SUMMER REPERTORY THEATRE COMPANY (6-12).** Pr., consent of the department; offered summers only. A concentrated workshop experience in all aspects of theatre production through participation in rehearsal and performance.
285. **DANCE TECHNIQUES (2).** Pr., TH 200 or COI. Introduction to dance fundamentals, including ballet and jazz. Repeatable for up to six credits.
300. **THEATRE LABORATORY (1-4).** Required of all theatre majors during every quarter of residency; a minimum of 9 hrs. required for graduation. Practice in various areas of arts and crafts of theatre, including construction and painting of scenery and properties, stage operation, lighting, sound, costuming, makeup, publicity, and business management.
302. **THEATRE APPRECIATION (1).** Attendance at selected local theatre and film productions with discussion sessions prior to and following performances. Brief critical papers required.
305. **CREATIVE DRAMATICS (3).** Leadership principles in creative dramatics; story materials and their adaptation to children's needs; techniques for planning, guiding, and evaluating improvised drama; emphasis on creative dramatics as a teaching/learning tool in the classroom.
306. **CHILDREN'S THEATRE (3).** Theatre for children, involving an examination of play scripts, acting, and production techniques.

310. **ACTING: PRACTICUM (1-4).** Open to students cast in Auburn University Theatre productions.
311. **VOICE FOR THE ACTOR II (2).** Pr., TH 211. Theory and techniques of stage voice, with emphasis on stage dialects and the International Phonetic Alphabet.
312. **ACTING II: CHARACTERIZATION (4).** Pr., TH 212. Theory and techniques of character analysis development and the process of creating a role through the study of characters in significant play texts.
313. **ACTING: PERFORMANCE TECHNIQUES FOR THE CAMERA (3).** LEC. 2, LAB. 2. Pr., COI. Theory, rehearsal, and performance of specialized acting techniques for film and television.
320. **STAGE MANAGEMENT (3).** Pr., TH 231 or COI. Basic principles of stage management, involving the duties of the stage manager in relation to production and personnel.
321. **DIRECTING: FUNDAMENTALS (4).** Pr., 211, 271 or COI. Theories and techniques of stage direction; analysis of plays; preparation of production plans; practice in stage direction, including open casting and production of at least two scenes before an invited audience.
322. **DIRECTING: ADVANCED (4).** Pr., 321 or COI. Advanced theories and techniques of stage direction; problems of dealing with actors, characterization and style; production of selected scenes and/or one-act play before an invited audience.
331. **ADVANCED THEATRE TECHNOLOGY (4).** Pr., 231 or COI. Practical application of new materials and techniques in the theatre, including plastics, metals, and other non-traditional products.
333. **SCENE PAINTING (4).** Pr., 240 or COI. Practical techniques and skills for executing the scenic/visual elements of theatrical designs, including traditional painting styles and non-traditional materials and methods.
341. **SCENE DESIGN I (4).** Pr., 240 or COI. Theory and practice of designing and executing scenery for the stage. Emphasis on traditional styles and methods. Fundamentals of presenting the design idea in perspective rendering and model form.
342. **PROPERTY DESIGN (3).** LEC. 2, LAB. 2. Pr., TH 240 or COI. History, theory and practice of designing and executing properties for the stage, including furniture.
345. **RENDERING FOR THE THEATRICAL DESIGNER (4).** Pr., 240 or COI. Exploration of traditional drawing and rendering techniques to facilitate designer communication in scenic, lighting and costume design. Exercises in handling a variety of artistic media.
351. **LIGHTING DESIGN (4).** Pr., 232, 240 or COI. Principles and practice of stage lighting both as a design and technical medium. Practical production experience in lighting traditional and experimental theatre spaces.
361. **COSTUME HISTORY I (4).** The history of costume from ancient Egypt through 1750.
362. **COSTUME HISTORY II (4).** The history of costume from 1750 to the present.
363. **ADVANCED COSTUME CONSTRUCTION I (4).** Pr., 261 or COI. The study of pattern drafting and draping and their relationship to a costumer's craft.
365. **COSTUME DESIGN I (4).** Pr., 240, 361, 362 or COI. Principles and practice of costume design with emphasis on designing and rendering costumes from various historical periods.
371. **HISTORY OF THEATRE I (3).** Social, religious, political, and artistic forces that have contributed to the development of theatre and drama in western civilization from its origin through the Medieval theatre.
372. **HISTORY OF THEATRE II (3).** Social, religious, political, and artistic forces that have contributed to the development of theatre and drama in western civilization beginning with the Renaissance and continuing through French Neo-Classical.
373. **HISTORY OF THEATRE III (3).** Social, religious, political, and artistic forces that have contributed to the development of theatre and drama in western civilization beginning with English Restoration and continuing to 1875.
374. **HISTORY OF THEATRE IV (3).** Social, religious, political, and artistic forces that have contributed to the development of modern European theatre and drama from 1875 to 1980.
400. **PROFESSIONAL INTERNSHIP (1-12).** Pr., completion of core program in BFA theatre major and permission of the department. Internship with professional or community theatres in the student's general field of specialization (1 hr. credit for each 30 hrs work).
405. **THEATRE OPERATIONS/MANAGEMENT (4).** Theory and practice of theatre management and arts administration.
409. **THEATRE OPERATIONS/MANAGEMENT: SPECIAL PROJECTS (2-4).** Pr., COI. Selected projects in theatre management and arts administration.
411. **VOICE FOR THE ACTOR III (3).** Pr., TH 312. Advanced theory and techniques of speaking voice production for the stage.
412. **ACTING III: SCENE STUDY (4).** Pr., TH 312. Advanced characterization study and application, including rehearsal and performance of roles from selected scenes before an invited audience.
413. **ACTING: AUDITIONS (1).** Pr., 200 and COI. The theories, techniques and realities of auditions: preparation of 4-5 pieces with presentation of at least 2 selected pieces before an invited audience.
415. **ACTING: SENIOR STUDIO (1-3).** Pr., TH 312. Advanced studies in acting. Open only to BFA Performance majors with senior standing. May be repeated for up to nine credits.
419. **ACTING: SPECIAL PROJECTS (2-4).** Pr., COI; repeatable to a maximum of 8 hrs. Selected advanced projects or recitals for public theatre production.
421. **DIRECTING: PERIODS (4).** Pr., 322 or COI. Advanced theories and techniques of stage direction relating to problems of verse and period dramatic literature; production of selected scenes before an invited audience.

429. **DIRECTING: SPECIAL PROJECTS (2-4).** Pr., or COI; repeatable to a maximum of 8 hrs. Direction of a long one-act or full length play for public performance.
439. **THEATRE TECHNOLOGY: SPECIAL PROJECTS (2-4).** Pr., COI; repeatable to a maximum of 8 hrs. Selected projects in theatre technology and/or technical direction executed before a public audience.
441. **HISTORY OF DESIGN IN THE THEATRE (4).** A survey of design elements, including architecture, as practiced in the significant movements in theatre history from the time of the ancient Greeks to the present.
442. **SCENE DESIGN II (4). LEC. 3, LAB. 3.** Pr., 341 or COI. Advanced theory and practice in the use of scenery and light for the theatrical event. Emphasis on experimental and non-traditional design for a variety of theatre spaces.
449. **SCENE DESIGN: SPECIAL PROJECTS (2-4).** Pr., COI; repeatable to a maximum of 8 hrs. Selected projects in scenic design executed before a public audience.
459. **LIGHTING DESIGN: SPECIAL PROJECTS (2-4).** Pr., COI; repeatable to a maximum of 8 hrs. Selected projects in lighting design executed before a public audience.
461. **ADVANCED COSTUME CONSTRUCTION II (4).** Pr., 261 or COI. The principles and execution of tailoring period and modern clothes for the stage and the utilization of a costumer's related crafts chosen from macrame, knitting, fabric painting, basic millinery, jewelry construction and cobbling.
465. **COSTUME DESIGN II (4). LEC. 3, LAB. 3.** Pr., 365 or COI. Advanced principles and practice of costume design with emphasis on designing and rendering costumes utilizing new and/or non-traditional approaches.
469. **COSTUME DESIGN: SPECIAL PROJECTS (2-4).** Pr., COI; repeatable to a maximum of 8 hrs. Selected projects in costume and/or makeup design executed before a public audience.
471. **AMERICAN THEATRE HISTORY I (3).** A survey of American theatre and drama from the beginnings to World War I.
472. **AMERICAN THEATRE HISTORY II (3).** A survey of American theatre and drama from World War I to the present.
475. **DRAMATIC THEORY AND CRITICISM (4).** A survey and analysis of selected writings on the structure and aesthetic values of both the drama and the theatre.
481. **THEATRE PRODUCTION II (4-8).** Pr., 281 and consent of the department; offered summers only. Advanced problems solving in theatre production with emphasis upon individual assignment to positions in the repertory theatre.
482. **SUMMER REPERTORY THEATRE COMPANY II (6-12).** Pr., 282 and consent of the department; offered summers only. An intensive experience in all aspects of theatre production. The advanced student may focus on the development of professional artistic skills.
491. **INDEPENDENT STUDY (1-4).** Pr., COI and the department head. Repeatable to a maximum of 16 hrs. Directed reading and tutorial projects of interest to the advanced student.
498. **THEATRE SEMINAR:** (various titles to be assigned) (1-8). Pr., COI; repeatable to a maximum of 16 hrs. Intensive study of special theatre topics falling outside the regular theatre offerings. Individual topics announced prior to offering of the course.

Veterinary Medicine (VM)

ANATOMY AND HISTOLOGY

Professors Krista, Head, and Gray

Associate Professors Buxton, Cartee, Garrett, Rumph, and Marshall

Assistant Professor Reynolds

LARGE ANIMAL SURGERY AND MEDICINE

Professors Kirk, Head, Purohit, Speirs, Vaughan, and Wiggins

Associate Professors Humburg, Powe, Wolfe, and Carson

Assistant Professors Duran, Putnam, Harrison, Schumacher, Riddell, Smyth, and Wallace

Residents Angel, Bailey, Moll, Pablo, and Mysinger

Intern Barone

PATHOBIOLOGY

Professors Wolfe, Head, Groth, Moore, Morgan,

Powers, Rossi, Smith, and Spano

Adjunct Professors Klesius, Lauerma, Lindsey, and Robinson

Associate Professors Blagburn, Boosinger, Hoerr, Kwapien, Nusbaum, Panangala,

D. Stringfellow, Swango, Teer, Wilt, and Hendrix

Adjunct Associate Professors Bone, Christenberry, Frandsen, and Giambone

Assistant Professors Bird, Boudreaux, Brunner, Cox, Hanrahan, Van Santen, Weiss, and Wright

Adjunct Assistant Professor Young

Adjunct Instructors D'Andrea and J. Stringfellow

Research Associates Gangopadhyay, Gresham, Rowe, and Toivio-Kinnucan

Residents Oliver and Sartin

PHYSIOLOGY AND PHARMACOLOGY

Professors Clark, *Head*, Beckett, Robertson, and Wilson
 Associate Professors Branch, R. Kemppainen, and Sartin
 Assistant Professors B. Kemppainen and Myers
 Residents Higgins and Zerbe
 Research Associate Fawver and Young

RADIOLOGY

Professor Bartels, *Head*
 Assistant Professors Brawner and Hathcock
 Resident Hudson

SMALL ANIMAL SURGERY AND MEDICINE

Professors Knecht, *Head*, Braund, Dillion, Hanks,
 Henderson, Horne, Milton, and Swaim
 Adjunct Professors Hughston and Silberman
 Associate Professors Angarano, MacDonald, Pidgeon, Simpson, Sorjonen, and Steiss
 Assistant Professors Brewer, Broaddus, Mann, Mansfield, and Wiggins
 Residents Bentley, Bowers, Lindley, Perry, Shealy, and Thomas
 Interns Nix, Keil, and Fidel

VETERINARY MEDICINE (VM)

Following this section of Veterinary Medicine Course Descriptions, the remaining VM courses are listed under their alphabetically arranged departments.

- 300. **ORIENTATION** (2). Fall. Dynamics of professional responsibilities, duties and privileges of the veterinarian.
- 313. **PHYSIOLOGY I** (5). **LEC.** 5. Fall. Cell physiology and neuroscience.
- 314. **PHYSIOLOGY II** (5). **LEC.** 5. Winter. Cardiovascular and respiratory physiology.
- 315. **PHYSIOLOGY III** (5). **LEC.** 4. **LAB.** 2. Spring. Kidney, liver, and digestive systems.
- 316. **PHYSIOLOGY IV** (5). **LEC.** 5. Winter. Endocrinology, reproduction, and integrative physiology.
- 319. **PHARMACOLOGY I** (5). **LEC.** 4. **LAB.** 2. Fall. Introductory pharmacology and CNS drugs.
- 320-321-322. **ANATOMY I, II, III** (5-5-5). **LAB.** 10. Fall, Winter, Spring. Gross anatomy of domestic animals. The gross structures of the dog, cat, ox, horse, hog and fowl.
- 326. **MICROSCOPIC ANATOMY I** (3). **LEC.** 1. **LAB.** 4. Fall. Microscopic anatomy of the form, structure, and characteristics of the basic tissues of animals.
- 327. **MICROSCOPIC ANATOMY II** (4). **LEC.** 1. **LAB.** 6. Pr., VM 326. Winter. Microscopic anatomy of the gastrointestinal, hemopoietic, integumentary, respiratory, and lymphoid systems.
- 328. **MICROSCOPIC ANATOMY III** (4). **LEC.** 2. **LAB.** 4. Pr., VM 327. Spring. Microscopic anatomy of the urogenital, endocrine, auditory, and visual systems as well as placentation.
- 331. **VETERINARY MICROBIOLOGY I** (4). **LEC.** 3. **LAB.** 2. Fall. Veterinary immunology and principles of epidemiology.
- 401. **PHARMACOLOGY II** (3). **LEC.** 2. **LAB.** 2. Winter. Cardiovascular, renal, and gastrointestinal drugs.
- 402. **PHARMACOLOGY III** (2). **LEC.** 2. Spring. Pharmacology of antibacterial drugs.
- 405. **PATHOLOGY I** (5). **LEC.** 4. **LAB.** 2. Pr., VM 322, 328. Fall. General concepts of pathology, introduction to disease processes affecting animals, laboratory work on gross and microscopic pathological changes.
- 406. **PATHOLOGY II** (5). **LEC.** 4. **LAB.** 2. Pr., VM 405. Winter. Continuation of VM 405.
- 407. **PATHOLOGY III** (4). **LEC.** 3. **LAB.** 2. Pr., VM 406. Spring. Continuation of VM 406.
- 408. **LABORATORY ANIMAL MEDICINE** (3). **LEC.** 2. **LAB.** 2. Pr., VM 405 and 406. Fall. Management, utilization, and disease of the common laboratory mammals including rats, mice, guinea pigs, hamsters, rabbits, and nonhuman primates.
- 409. **VETERINARY PARASITOLOGY I** (4). **LEC.** 3. **LAB.** 2. Fall. Introduction to parasitology including internal and external parasites of domestic animals.
- 410. **VETERINARY PARASITOLOGY II** (4). **LEC.** 3. **LAB.** 2. Pr., VM 409. Winter. Continuation of VM 409.
- 411. **VETERINARY MICROBIOLOGY II** (5). **LEC.** 4. **LAB.** 2. Pr., VM 331. Winter. Bacteriology and mycology.
- 412. **VETERINARY MICROBIOLOGY III** (5). **LEC.** 4. **LAB.** 2. Pr., VM 331 and 411. Spring. Veterinary virology. Chlamydia is considered briefly.
- 413. **MICROBIOLOGY IV** (5). **LEC.** 4. **LAB.** 2. Applied immunology, preventive medicine, and zoonoses.

414. **L.A. MEDICINE I (5). LEC. 5.** Fall. Detailed etiology, symptoms, pathogenesis, diagnosis, treatment, and prevention of the medical diseases affecting the various systems and organs of the equine, bovine, ovine and porcine species.
420. **L.A. MEDICINE II (5). LEC. 5.** Fall. Continuation of VM 414 and includes nutritional deficiency diseases.
421. **INTRODUCTION TO VETERINARY SURGERY (3). LEC. 3.** Fall. Background of surgery; major surgical injuries — wounds, fluid loss and infection; preoperative and postoperative care; surgical techniques; anesthesia.
422. **L.A. SURGERY (3). LEC. 3.** Winter. Special surgical diseases of the domestic farm animals including surgery of the alimentary canal, the chest and abdomen, the respiratory and cardiovascular systems, the eye and ear, the genito-urinary tract, and the feet and limbs.
423. **CLINICAL PATHOLOGY (5). LEC. 5.** Pr., VM 407. Spring. Methods for the collection, preservation and examination of various body fluids including blood and urine. Interpretation of results is directed toward clinical diagnosis and prognosis.
424. **S.A. MEDICINE & SURGERY II (6).** Fall. The diagnostics, medical and surgical treatment of small animals.
425. **S.A. MEDICINE & SURGERY III (5).** Pr., VM 424. Winter. Continuation of VM 424.
427. **S.A. MEDICINE & SURGERY I (4). LEC. 4.** Spring. The systemic diseases and clinical immunologic procedures in small domestic animals.
428. **L.A. PHYSICAL DIAGNOSIS (2). LEC. 1, LAB. 2.** Spring. Demonstration and application of principles and techniques of physical diagnosis of large animals.
429. **S.A. PHYSICAL DIAGNOSIS (1). LAB. 2.** Winter. Demonstration and practice of handling, restraint, physical diagnosis, and administration of therapeutic agents related to small animals.
430. **VETERINARY JURISPRUDENCE AND ETHICS (2).** Winter. Laws relating to the veterinary profession. Professional ethics for the veterinarian.
431. **VETERINARY RADIOLOGY (4). LEC. 4.** Fall. Basic diagnostic radiology including interpretations, techniques, therapy and equipment.
432. **MICROBIOLOGY V (3). LEC. 3.** Pr., VM 411. Winter. Principles and methodology of food hygiene.
434. **APPLIED ANATOMY (2). LAB. 4.** Spring. Anatomy related to diagnostic, obstetrical and surgical procedures.
435. **THERIOGENOLOGY (5). LEC. 5.** Spring. Clinical application of the physiology of reproduction, causes and correction of dystocia, genital examinations, and infertility of the male and female.
436. **SPECIAL ANATOMY (1-5). (HOURS AND CREDIT TO BE ARRANGED.)** Pr., VM 320. Elective course in which any phase of anatomy of domestic animals to the anticipated field on specialization may be studied.
437. **VETERINARY TOXICOLOGY (5).** Summer. Identification and study of selected poisonous plants of the U.S. and common chemical and venom poisoning of farm animals and pets. To include characteristic signs, lesions, methods of diagnosis, and treatment.
- 438-439. **L.A. MEDICINE III, IV (4-5).** Winter, Fall. Principal infectious diseases of large domestic animals. Epizootiology, etiology, clinical signs, diagnosis and diseases control including immunization and sanitation.
- 440-441-442-443. **S.A. CLINICS I, II, III, IV (6-6-6-6).** Spring, Summer, Fall, Winter. Conferences, laboratory exercises, and practice in diagnosis, control, and therapy of diseases of small animals.
- 444-445-446-447. **L.A. CLINICS AND LARGE ANIMAL SURGERY AND THERIOGENOLOGICAL EXERCISES I, II, III, IV, (7-7-7-7). LAB. (12-18-17-18).** Spring, Summer, Fall, Winter. Conferences, laboratory exercises, and practice in diagnosis, control, and therapy of diseases and surgical procedures for large domestic animals.
448. **S.A. SURGERY PRACTICUM I (2). LAB. 4.** Fall. Introductory and detailed consideration and performance of small animal surgery.
449. **S.A. SURGERY PRACTICUM II (2). LAB. 4.** Pr., VM 428 & 448. Winter. Detailed consideration and performance of small animal surgery (continued).
451. **VETERINARY PUBLIC HEALTH I (2). LEC. 2.** Pr., VM 411. Winter. Principles and methodology of food hygiene including meat, milk, poultry, and other foods related to animal and human health.
452. **VETERINARY PUBLIC HEALTH II (2). LEC. 2.** Pr., VM 451. Winter. A continuation of VM 451.
454. **PRECEPTORSHIP (0). NON-CREDIT REQUIRED COURSE.** Spring. Completion of satisfactory preceptorship during the spring quarter is required for graduation.

ANATOMY AND HISTOLOGY (VAH) ADVANCED UNDERGRADUATE AND GRADUATE

- 520-521-522. **ANATOMY I, II, III (5-5-5). LEC. 2, LAB. 10.** Pr., COI. Fall, Winter, Spring. Gross anatomy of domestic animals. A comparative study of the gross structures of the dog, cat, horse, hog, fowl, laboratory animals and zoo animals.
526. **MICROSCOPIC ANATOMY I (5). LEC. 2, LAB. 6.** Pr., COI. Fall. Microscopic anatomy of the form, structure, and characteristics of the basic tissues of animals.
527. **MICROSCOPIC ANATOMY II (5). LEC. 2, LAB. 6.** Pr., COI. Winter. Microscopic anatomy of the tissue composition of organs and organ systems.
528. **MICROSCOPIC ANATOMY III (4). LEC. 2, LAB. 4.** Pr., COI. Spring. Microscopic anatomy of the reproductive organs. Formation and early development of the embryos of domestic animals. Fetal membranes and placentation are emphasized.

GRADUATE

621. **CARDIOVASCULAR ANATOMY (5).** LEC. 2, LAB. 9. Pr., COI. Quarter by arrangement. Structure of the cardiovascular system. Comparative developmental, and gerontologic phases emphasized.
622. **A COMPARATIVE STUDY OF THE UROGENITAL SYSTEM IN ANIMALS (5).** LEC. 2, LAB. 9. Pr. COI. Quarter by arrangement. Structure of the urinary and genital systems.
623. **NEUROANATOMY (5).** LEC. 2, LAB. 9. Pr., COI. Quarter by arrangement. Structure of the central and peripheral nervous systems.
624. **EXPERIMENTAL NEUROANATOMY (5).** LEC. 2, LAB. 9. Pr., COI. Quarter by arrangement. Use of the Horsley-Clark stereotaxic instrument and other experimental neuroanatomical procedures.
625. **ANATOMY OF THE LOCOMOTOR SYSTEM (5).** LEC. 2, LAB. 9. Pr., COI. Quarter by arrangement. Dissection of the structures of the locomotor system. The horse is utilized as the primary model.
626. **ANATOMY OF THE SPECIAL SENSES (5).** LEC. 2, LAB. 9. Pr., COI. Quarter by arrangement. Taste, smell, sight, and hearing. Macroscopic and microscopic specimens are utilized to correlate structure and function.
627. **ADVANCED HISTOLOGY OF DOMESTIC ANIMALS (5).** LEC. 2, LAB. 6. Pr., COI. Quarter by arrangement. The basic tissues. The light microscope and electron micrographs are utilized to interpret morphology.
628. **ADVANCED ORGANOLOGY OF DOMESTIC ANIMALS (5).** LEC. 2, LAB. 6. Pr., COI. Quarter by arrangement. Organs and organ systems, utilizing the light microscope and electron micrographs to interpret morphology.
670. **HISTOLOGICAL TECHNIQUES (2-5).** Pr., COI. Quarter by arrangement. Detailed techniques employed in the preparation of cytological histological materials.
696. **SEMINAR (1).** QUARTER BY ARRANGEMENT. Required of all graduate students who major in Veterinary Anatomy and Histology.
698. **RESEARCH PROBLEMS (2-5).** (QUARTER AND CREDIT BY ARRANGEMENT.)
699. **RESEARCH AND THESIS.** (CREDIT TO BE ARRANGED.)
799. **RESEARCH AND DISSERTATION.** (CREDIT TO BE ARRANGED.)

LARGE ANIMAL SURGERY AND MEDICINE (VLA)

GRADUATE

- 651-652-653. **ADVANCED LARGE ANIMAL SURGERY (5-5-5).** LEC. 1, LAB. 8. Any quarter by arrangement. Research in surgery. Advanced techniques for surgical procedures in the domestic animals.
654. **ADVANCED FOOD ANIMAL MEDICINE (5).** LEC. 3, LAB. 4. Any quarter by arrangement. An advanced study of principles of clinical medicine with emphasis on causes, methods of metabolic and infectious diseases of bovine, sheep, goat, and swine.
655. **ADVANCED EQUINE MEDICINE (5).** LEC. 3, LAB. 4. Any quarter by arrangement. Special study with emphasis on metabolic, musculoskeletal and infectious diseases of equine.
657. **GYNECOLOGY OF LARGE DOMESTIC ANIMALS (5).** Any quarter by appointment. Functional and infectious conditions affecting female reproduction.
658. **ANDROLOGY OF LARGE DOMESTIC ANIMALS (5).** Any quarter by arrangement. Functional and infectious conditions affecting breeding sires.
659. **ADVANCED VETERINARY ANESTHESIOLOGY (5).** LEC. 3, LAB. 4. Pr., COI and Graduate Standing, Summer. Advanced anesthetic principles and uses of various anesthetic agents in veterinary medicine with emphasis on clinical monitoring of physiological parameters and intensive care of clinical patients.
660. **HEALTH MAINTENANCE OF FOOD ANIMALS (5).** LEC. 5. Pr., graduate standing and COI. Any quarter by arrangement. Advanced principles of health maintenance of food and fiber animals emphasizing sustenance of the health state rather than the employment of restorative or preventive medicine.
661. **RECONSTRUCTIVE SURGERY (5).** LEC. 2, LAB. 6. Fall. Even years. Techniques in reconstructive surgery in small and large animals.
696. **SEMINAR (1).** REQUIRED OF ALL GRADUATE STUDENTS IN LARGE ANIMAL SURGERY AND MEDICINE. Meets at scheduled intervals each year.
698. **RESEARCH PROBLEMS (2-5).** (CREDIT TO BE ARRANGED.)
699. **RESEARCH AND THESIS.** (CREDIT TO BE ARRANGED.)
799. **RESEARCH AND DISSERTATION.** (CREDIT TO BE ARRANGED.)

PATHOBIOLOGY (VPB)

GRADUATE

601. **DETERMINATIVE VETERINARY BACTERIOLOGY (5).** LEC. 3, LAB. 4. Quarter by arrangement. Identification, classification, nomenclature, distribution and systematic relationship of bacteria of veterinary significance.

602. **BACTERIAL PATHOGENESIS (5).** LEC. 5. Quarter by arrangement. Pr., COI. How bacteria cause disease. The cellular and subcellular basis for bacterial pathogenesis. Study of bacterial toxins, host bacteria interaction, mixed bacterial and bacterial-viral infections.
604. **IMMUNOBIOLOGY I (5).** LEC. 5. Quarter by arrangement. Pr., basic immunology and COI. The biologic basis of the immune response. Immunocompetent cells. Various types of immune responses. Histocompatibility and immunogenetics.
605. **IMMUNOLOGY OF INFECTIOUS DISEASES (5).** LEC. 5. Quarter by arrangement. Pr., COI. The immune mechanism of selected models of human and animal infectious diseases.
606. **BOVINE VIROLOGY (5).** LEC. 3, LAB. 4. Quarter by arrangement. Pr., COI. Bovine viruses and the diseases they produce. Laboratory work includes techniques of studying bovine viruses and evaluating the resistance of the bovine to viral diseases.
607. **PATHOGENESIS OF VIRUS DISEASES OF ANIMALS (5).** LEC. 5. Spring. Pr., COI. How animal viruses produce disease in their hosts. Various well-studied models are used to demonstrate current theories and knowledge of pathogenetic mechanisms of virus-induced neurological diseases, enteric diseases, respiratory diseases, immune-complex diseases, and neoplastic diseases.
608. **ADVANCED EPIDEMIOLOGY (5).** LEC. 4, LAB. 2. Any quarter by arrangement. Pr., COI. Advanced techniques in epidemiological investigation: their application to diseases of man and animals for control purpose.
609. **MEDICAL MYCOLOGY (5).** LEC. 3, LAB. 4. Quarter by arrangement. Pr., COI and acceptable courses in bacteriology. Methods and techniques used in isolating and propagating yeasts, molds, and actinomycetes pathogenic for animals. Laboratory diagnosis of fungus infections in animals.
610. **IMMUNOBIOLOGY II (5).** LEC. 5. Quarter by arrangement. Pr., COI and VPB 604. Modern theories of advanced medical immunology.
611. **COMMUNICATION OF EXPERIMENTAL WORK IN BIOMEDICAL SCIENCES (1).** LEC. 1. Winter. Pr., COI. An introduction to methods of information retrieval and storage; the evaluation of scientific reports; the organization and preparation of data for the oral and written reports.
612. **METHODS OF IMMUNOLOGY (3-5).** LEC. 1, LAB. 8. Fall, odd years. Pr., COI. Advanced technology in the areas of immunobiology, immunochemistry, and immunopathology are offered. The course requires the formulation of a hypothesis, a literature search, utilization of at least 3 different immunologic techniques to solve the problem, and writing a paper, in journal style, to report the results of the problem solving exercises.
613. **CLINICAL IMMUNOLOGY (3).** LEC. 3. Winter, even years. Pr., COI. Basic Immunology. Histology and/or Introductory Pathology. The course will present current concepts in clinical immunology and immunopathology. Emphasis is placed on the diseases mediated by the immune response and the techniques required to diagnose immunologic disorders. The course is taught on a systems basis and is designed for individuals with a clinical background or interest.
614. **DIAGNOSTIC TECHNIQUES IN VETERINARY MICROBIOLOGY (5).** LEC. 1, LAB. 4. Pr., COI. Quarter by arrangement. Acquaint advanced microbiology students with techniques used in the modern microbiological diagnostic lab.
615. **IMMUNOBIOLOGY (3-5).** Pr., VPB 604. Quarter by arrangement. Provides an analysis and examination of the current literature in immunobiology.
621. **MOLECULAR GENETICS OF CELL GROWTH AND DEVELOPMENT (3).** LEC. 2, LAB. 2. Winter. Pr., ZY 310, MB 522 or equivalent and COI. Emphasis will be placed upon the molecular mechanisms that regulate gene expression as well as normal and aberrant cell growth/development and their analysis by modern recombinant DNA techniques.
631. **VETERINARY BACTERIOLOGY (4).** LEC. 2, LAB. 4. Fall. Pr., COI. Bacteriology of veterinary pathogens. Lecture same as VM 411.
632. **VETERINARY MICROBIOLOGY III (5).** LEC. 3, LAB. 4. Winter. pr., COI. Lecture same as VM 412. Animal viruses and associated diseases, pathogenesis of viral oncology, and host responses to viral infections and tumors. Chlamydia and rickettsia are considered briefly.
633. **PREVENTIVE MEDICINE (4).** LEC. 4, LAB. 0. Spring. Pr., COI. Lecture same as VM 413. Principles of epidemiology, preventive medicine and environmental health. Selected diseases of animals transmissible to man and the relationship of veterinarians to public health and animal disease control agencies.
634. **VETERINARY MYCOLOGY (2).** LEC. 1, LAB. 2. Winter. Pr., COI. Mycology of veterinary pathogens. Lecture same as VM 432.
636. **TISSUE CULTURE TECHNIQUES AND APPLIED VIROLOGY (3).** LEC. 1, LAB. 6. Fall. Pr., Department approval. Fundamentals of mammalian tissue and cell culture with respect to the importance of water quality, media and buffers, glassware, plasticware; procedures of washing and sterilizing labware and equipment; techniques of primary tissue culture and the culture of continuous cell lines; and methods for the study of viruses in cell cultures.
640. **TOPICS IN ANAEROBIC BACTERIOLOGY (3).** LEC. 2, LAB. 2. Pr., COI. Quarter by arrangement. Current concepts in medical anaerobic bacteriology and diagnostic techniques to isolate and identify anaerobic bacteria.
641. **PATHOLOGY (2-5).** LEC. 2, LAB. 9. Pr., D.V.M. degree or equivalent, COI. Any quarter by arrangement. May be taken more than 1 quarter for a maximum of 10 credits in M.S. program or 20 credits in Ph.D. program. Mechanisms of response in domestic animals to diseases, the description and recognition of lesions, and other topics to meet the particular needs of students.
642. **GENERAL PATHOLOGY (5).** LEC. 4, LAB. 2. Pr., satisfactory courses in histology and physiology, COI. Fall quarter, first eight weeks. The fundamental alterations of disease, for especially qualified graduate students.

643. **GROSS PATHOLOGY (2).** LAB. 6. Pr., VM 405 or VPB 642, and COI. Any quarter by arrangement. Regular participation in the necropsy examinations under the supervision of senior staff members. Gives the graduate student experience in necropsy procedures and in diagnostic-interpretation of gross lesions.
644. **DIAGNOSTIC PATHOLOGY (2-5).** Any quarter by arrangement. Limited to graduate students and residents in pathology. The diagnosis of animal diseases using necropsy procedures and histopathologic examination of tissue sections. Work will be under the supervision of a senior pathologist.
645. **SURGICAL PATHOLOGY (1-3).** Any quarter by arrangement. Limited to graduate students and residents in pathology. The histopathologic diagnosis of surgical biopsy specimens. Work will be under the supervision of a senior pathologist.
646. **SPECIAL TECHNIQUES IN HISTOPATHOLOGY (3).** LEC. 1, LAB. 4. Pr., COI. Any quarter by arrangement. Special stains and techniques of histochemistry employed in the preparation of materials for histopathologic study.
647. **AVIAN PATHOLOGY (5).** LEC. 3, LAB. 4. Pr., VM 405 or VPB 642. Summer, odd years. Gross, microscopic, ultrastructural and biochemical pathology of diseases in poultry, psittacines, waterfowl, raptors and other avian species.
648. **ADVANCED VETERINARY OPHTHALMIC PATHOLOGY (5).** LEC. 3, LAB. 4. Pr., VM 405 or VPB 642. Summer, odd years. Gross, microscopic, and ultrastructural pathology of diseases of the eye in domestic animals.
650. **ADVANCED CLINICAL PATHOLOGY I (5).** LEC. 5. Pr., VM 423 or equivalent. Fall. A comprehensive evaluation of diseases altering the lymphohematopoietic system.
651. **ADVANCED CLINICAL PATHOLOGY II (5).** LEC. 5. Pr. VM 423 or equivalent. Winter. The concepts relating modern laboratory investigations to disease pattern recognition.
653. **DIAGNOSTIC ONCOLOGY (5).** LEC. 1, LAB. 8. Pr., D.V.M. or equivalent. COI. Any quarter by arrangement. Gross and microscopic pathology of neoplasms of domestic animals.
654. **CLINICAL ONCOLOGY (5).** LEC. 5. Concepts useful in the diagnosis and treatment of neoplastic diseases.
658. **MECHANISMS OF TOXICOLOGIC DISEASE (5).** LEC. 4, LAB. 2. Pr., Basic knowledge of mammalian physiology and biochemistry. COI. Spring. Pathophysiology involved in the development of animal diseases associated with environmental and naturally occurring toxicants, morphologic implications, opportunity to select clinical, pathological, or analytical aspects of toxicology for laboratory assignments.
660. **HEALTH MAINTENANCE OF FOOD ANIMALS (5).** LEC. 5. Pr., graduate standing. COI. Any quarter by arrangement. An advanced study of the principles of health maintenance of food and fiber animals emphasizing sustenance of the health state rather than the employment of restorative or preventive medicine. Same as VLA 660.
665. **ANIMAL MODELS FOR BIOMEDICAL RESEARCH (5).** LEC. 2, LAB. 6. Pr., D.V.M. degree or equivalent and COI. Any quarter by arrangement. Principles of disease processes in domestic and laboratory animals for use as experimental models in biomedical research.
670. **VETERINARY PROTOZOOLOGY AND ENTOMOLOGY (5).** LEC. 3, LAB. 4. Pr., VM 410 or ZY 511, COI. Spring, odd years. Pathogenesis, diagnosis, therapy, and other topics relating to selected diseases of veterinary importance caused by protozoan and arthropod parasites.
674. **VETERINARY HELMINTHOLOGY (5).** LEC. 3, LAB. 4. Pr., VM 410 or ZY 511 or equivalent, COI. Summer, even years. Pathogenesis, diagnosis, therapy, and other topics relating to selected diseases of veterinary importance caused by helminth parasites.
678. **PATHOLOGY OF PARASITIC DISEASES (5).** LEC. 2, LAB. 6. Pr., VPB 642, COI. Spring, even years. Gross and microscopic pathology of parasitic diseases of veterinary importance.
690. **SLIDE SEMINAR (1).** All quarters. Limited to graduate students and residents in pathology. Weekly slide conference to discuss current diagnostic material. Required participation by all graduate students and residents in pathology.
696. **SEMINAR (1).** Quarter by arrangement. Required of all graduate students with a major in Pathobiology.
698. **RESEARCH PROBLEMS (2-5).** (QUARTER AND CREDIT BY ARRANGEMENT.)
699. **RESEARCH AND THESIS (QUARTER AND CREDIT BY ARRANGEMENT.)**
799. **RESEARCH AND DISSERTATION (QUARTER AND CREDIT BY ARRANGEMENT.)**

PHYSIOLOGY AND PHARMACOLOGY (VPH)

GRADUATE

601. **MEDICAL PHYSIOLOGY I (5).** LEC. 4, LAB. 2. Pr., an acceptable course in physiology. Fall & Spring. Functional analysis of mammalian organ systems with special emphasis on myology, neurology, circulation and respiration.
602. **MEDICAL PHYSIOLOGY II (5).** LEC. 4, LAB. 2. Pr., an acceptable course in physiology. Winter & Spring. A continuation of VPH 601 with special emphasis on digestive, excretory, endocrine and reproductive systems.
605. **RESPIRATORY PHYSIOLOGY (5).** Pr., VPH 601. Summer. A detailed study of respiratory physiology and the physiological aspects of environmental adaptation.
610. **EXPERIMENTAL PHYSIOLOGICAL TECHNIQUES (5).** LEC. 3, LAB. 6. Pr., COI. Spring. Anesthetic and surgical techniques used in many research procedures. Not for veterinary students.
613. **PHYSIOLOGY I (5).** LEC. 5. Fall. Cell physiology, digestion and metabolism.
614. **PHYSIOLOGY II (2).** LEC. 2. Fall. Respiratory physiology.
615. **PHYSIOLOGY III (5).** LEC. 5. Winter. Endocrinology and reproductive physiology.
616. **PHYSIOLOGY IV (4).** LEC. 3, LAB. 2. Winter. Cardiology.

618. **PHYSIOLOGY VI (4).** LEC. 4. Spring. Cardiovascular and renal physiology.
619. **PHARMACOLOGY I (2).** LEC. 2. Spring. Introductory and cardiovascular pharmacology.
621. **PHARMACOLOGY II (3).** LEC. 2, LAB. 2. Fall. Drugs acting on the central nervous system.
622. **PHARMACOLOGY III (4).** LEC. 3, LAB. 2. Winter. Pharmacology of antibacterial drugs.
623. **PHYSIOLOGY VI (3).** LEC. 3. Fall. Neurophysiology, neurology, and ethology.
624. **PHYSIOLOGY VII (3).** LEC. 2, LAB. 2. Winter. Neurophysiology, neurology, and ethology.
631. **ADVANCED RENAL AND HEPATIC PHYSIOLOGY (5).** LEC. 4, LAB. 3. Summer. The physiology of the liver and kidney and the effects that certain disease processes have on these organs.
632. **ADVANCED ENDOCRINOLOGY AND REPRODUCTION (5).** LEC. 4, LAB. 3. Fall. Physiological regulation of endocrine glands, and the synthesis, secretion, and action of the hormones. Emphasis placed on the metabolic regulatory hormones.
633. **ADVANCED NEUROPHYSIOLOGY AND NEUROLOGY (5).** LEC. 4, LAB. 3. Winter. The physiology of the mammalian nervous system.
634. **VETERINARY CLINICAL PHARMACOLOGY (5).** LEC. 4, LAB. 2. Pr., a DVM or equivalent degree or COI. Summer of odd years or by arrangement. The course includes applied pharmacokinetics, influence of disease on drug disposition, the development of dosage regimens, and drug assay methodology. The laboratories include techniques in drug assay by RIA, HPLC, microbiological, and other methods.
635. **ADVANCED PHARMACOLOGY I (5).** LEC. 4, LAB. 2. Pr., acceptable course in physiology or pharmacology. Spring or by arrangement. Principles and mechanisms of drug action, drug receptors, passage of drugs across biologic barriers; mechanisms of absorption, distribution, biotransformation, and excretion, and basic pharmacokinetic parameters. Drugs affecting the autonomic nervous system and muscle relaxants discussed.
636. **ADVANCED PHARMACOLOGY II (5).** LEC. 4, LAB. 2. Pr., acceptable courses in physiology or pharmacology. Summer or by arrangement. Drugs of veterinary interest that affect the cardiovascular, digestive, reproductive, urinary, and central nervous systems discussed.
637. **VETERINARY ANTIMICROBIAL THERAPEUTICS (5).** LEC. 5. Pr., COI and acceptable courses in pharmacology or a DVM or equivalent degree. Summer of even numbered years or by arrangement. Course coverage provides current indepth information on the pharmacology of drugs used in the treatment of infectious diseases of veterinary interest.
638. **PHYSIOLOGY OF DIGESTION (5).** LEC. 5. Spring. Enzymatic and bacterial digestion as well as the motility of the gastrointestinal tract in farm animals.
645. **CARDIOLOGY (5).** Fall. The physiology of the heart and advanced techniques used in electrocardiology.
696. **SEMINAR (1).** Required of all graduate students in this department.
698. **RESEARCH PROBLEMS (2-5).** (CREDIT TO BE ARRANGED.)
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
734. **ADVANCED TOPICS IN ENDOCRINOLOGY (3).** LEC. 3. Pr., VPH 632, CH 519. Summer. This course will examine detailed mechanisms of a specific gland or hormone including synthesis, regulation of secretion, mechanisms of action, physiology, and relevant diseases.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

RADIOLOGY (VR) GRADUATE

680. **RADIOLOGICAL TECHNIQUES (5).** LEC. 3, LAB. 4. Any quarter by arrangement. A detailed study of radiographic techniques including assignments on basic radiation physics.
667. **NORMAL RADIOLOGICAL ANATOMY (5).** LEC. 4, LAB. 2. Any quarter by arrangement. A detailed study of the normal structure, size and position of the various organs as they appear on flat and contrast radiographs.
668. **ADVANCED RADIOLOGY* (5).** LEC. 1, LAB. 8. Any quarter by arrangement. A detailed study of advanced radiographic techniques including fluoroscopy, uses of contrast mediums and the principles of image intensification and cineradiography.
669. **RADIOLOGICAL INTERPRETATIONS* (5).** LEC. 1, LAB. 8. Any quarter by arrangement.
696. **SEMINAR (1).** Required of all graduate students in Veterinary Medicine. Meets by arrangement during final quarter in Graduate School.
698. **RESEARCH PROBLEMS (2-5).** (CREDIT TO BE ARRANGED.)
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

SMALL ANIMAL SURGERY AND MEDICINE (VSA)

Candidates for a master's degree in the School of Veterinary Medicine may be required to pass a preliminary oral or written examination to demonstrate adequate knowledge in their chosen fields. They must meet the general requirements for admission into the Graduate School.

647. **CANINE NEUROSURGERY (5).** LEC. 2, LAB. 6. Fall. By arrangement. The applied anatomy, physiology, physical and radiographic diagnosis, and surgical correction of lesions (especially those of traumatic origin) affecting the nervous system of the dog.
659. **ADVANCED VETERINARY ANESTHESIOLOGY (5).** LEC. 3, LAB. 6. Summer by arrangement. Advanced anesthetic principles and uses of various anesthetic agents in veterinary medicine with emphasis on clinical monitoring of physiological parameters and intensive care of critical patients.
660. **ADVANCED SMALL ANIMAL SURGERY (5).** LEC. 3, LAB. 6. Spring by arrangement. Techniques in general small animal surgery.
661. **RECONSTRUCTIVE SURGERY (5).** LEC. 2, LAB. 6. Fall by arrangement. Techniques in reconstructive surgery in small and large animals.
662. **ADVANCED SMALL ANIMAL ORTHOPEDIC SURGERY (5).** LEC. 3, LAB. 6. Spring by arrangement. New techniques in general orthopedic surgery.
663. **ADVANCED VETERINARY OPHTHALMOLOGY I. GENERAL OPHTHALMOLOGY (5).** LEC. 3, LAB. 4. By arrangement. Advanced general techniques of diagnosis, medication and surgical techniques necessary for veterinary ophthalmology.
- 664-665. **ADVANCED SMALL ANIMAL MEDICINE (5-5).** LEC. 5. By arrangement. The causes, methods of diagnosis, treatment and control of non-surgical diseases of small animals.
666. **ADVANCED CANINE NEUROLOGY (5).** LEC. 3, LAB. 6. By arrangement. The neurodiagnostics and non-surgical therapy of neurological disorder in small domestic animals.
671. **SMALL ANIMAL CARDIOVASCULAR SURGERY (5).** LEC. 3, LAB. 6. By arrangement. Application of accepted, as well as the recently developed techniques of cardiovascular surgery.
672. **ADVANCED VETERINARY OPHTHALMOLOGY II. INSTRUMENTATION (5).** LEC. 2, LAB. 6. By arrangement. Emphasis is placed on the use of advanced instrumentation necessary for the diagnosis and treatment of ocular disease.
673. **ADVANCED VETERINARY OPHTHALMOLOGY III. ADVANCED OPHTHALMIC MEDICINE (5).** LEC. 5. Pr., VSA 672. By arrangement. Ophthalmology with emphasis on diagnosis and treatment of ocular diseases.
674. **ADVANCED VETERINARY OPHTHALMOLOGY IV. ADVANCED OPHTHALMIC SURGICAL TECHNIQUE (5).** LEC. 2, LAB. 6. Pr., VSA 673. Quarter by arrangement. Ophthalmology with emphasis on ophthalmic surgery.
696. **SEMINAR (1).** Required of all graduate students in Veterinary Medicine; Meets regularly at scheduled intervals each year during Summer Quarter.
698. **RESEARCH PROBLEMS (2-5).** (CREDIT TO BE ARRANGED.)
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Vocational and Adult Education (VED)

Professors Baker and Wilmoth

Associate Professors Drake, Acting Head, Hayes, Selman, Walters, and Wilson

Assistant Professors Bond, Halverson, Hartzog, Kaaska, O'Brien,
Patterson, Robinson, Street, Thompson, White, and Williams

100. **KEYBOARDING FOR INFORMATION PROCESSING (2).** LAB. 4. S/U. Basic instruction on standard keyboards for data entry into computers.
102. **ORIENTATION FOR TRANSFER STUDENTS (1).** Helps transfers from other curricula and students pursuing the dual objectives program to understand teacher education and teaching as a profession.
104. **ORIENTATION TO LABORATORY EXPERIENCES IN AREA OF SPECIALIZATION (1).**
200. **TYPEWRITING I* (3).** LAB. 5. Mastery of keyboard; techniques of machine operation; basic typewritten applications. For students with no previous training in typewriting. (Students with previous typewriting instruction not eligible for credit. Consult with VBU staff for placement.)
201. **TYPEWRITING II* (3).** LAB. 5. Pr., VED 200 or one year of high school typewriting. Emphasis on business letters, tabulation, reports.
202. **ADVANCED KEYBOARDING (5).** Pr., VED 201. Development of production competence and decision-making ability with application to information processing and formatting skills in executive, government, legal, medical, production-marketing, and accounting office situations. Activities in composition, proofreading, skill development, employment communications and testing.
205. **TRANSCRIPTION FUNDAMENTALS (1).** LAB. 2. Pr., VED 200 or COI.
210. **SHORTHAND I* (5).** Pr., VED 200 or equivalent. Basic course in Gregg shorthand. Emphasis on recognition of principles; rapid reading of notes; dictation of new material.
211. **SHORTHAND II* (5).** Pr., VED 210. Reinforcement of principles; speed building dictation; development of transcription skills.
216. **PLASTICS TECHNOLOGY (2).** LEC. 1, LAB. 2. Laboratory oriented course in material and processes of plastic products.
246. **INSTRUCTIONAL DRAWING (3).** LAB. 6. Preparing for the shop laboratory, including making freehand and pictorial sketches and drawings, reading working drawings, blue prints, manufacturers guides, and lettering, use of instruments, dimensioning, making models, floor plans, bills for materials, writing specifications, and developing working plans.

301. **PRACTICUM IN WOODWORKING (3). LEC. 1, LAB. 4.** Introduction to machines, tools used in working with wood and studies in design, construction, and finishing objects of wood.
305. **RECORDS MANAGEMENT (3).** Basic procedures of filing, records storage and control. Practice in record keeping.
312. **SHORTHAND/TRANSCRIPTION* (5).** Pr., VED 211. Emphasis on theory development, communication skills, transcription techniques, and proofreading. Transcription of office-style dictation and production of business correspondence in mailable form. Individualized development of dictation speed, transcription speed, and correspondence production rates.
315. **MACHINE TRANSCRIPTION (1-3).** Pr., VED 312 and/or COI. Provides instruction and practice in the production of general business correspondence in mailable form from recorded dictation. May be taken more than one quarter for a maximum of 3 credits in order to specialize in legal and/or medical transcription.
346. **VOCATIONAL AND ADULT EDUCATION. (3). LEC. 2, LAB. 2.** Principles of vocational education and their application in developing and operating preparatory and in-service programs.
352. **MEDICAL TERMINOLOGY FOR HEALTH RELATED OCCUPATIONS (5).** Equips the student with the essential medical terminology for effective communications among the various members of the health team.
354. **CAREERS IN HEALTH RELATED OCCUPATIONS (5).** Identification of role and function in health related occupations including the range of occupations that require minimum training as well as those that require University level education.
356. **HEALTH DELIVERY SYSTEMS (5).** Contemporary and emerging patterns in delivering health services.
400. **INTRODUCTION TO POWER MECHANICS (3). LEC. 1, LAB. 4.** Design and operational theories related to power machines. Internal combustion engines; power trains; hydraulic and cooling systems.
401. **PRACTICUM IN SMALL GASOLINE ENGINES (3). LEC. 1, LAB. 4.** Application of skills and abilities needed in teaching the maintenance and repair of small air cooled engines. Theories of compression, carburetion and ignition; laboratory exercises in repair and maintenance.
402. **AUTOMOTIVE CONSTRUCTION AND REPAIR (3). LEC. 1, LAB. 4.** Theories of design, principles of operation, and maintenance and repair of ignition system, fuel systems, power systems and chassis components.
404. **PRACTICUM IN GENERAL METALS (3). LEC. 1, LAB. 4.** Application of skills and abilities needed in the teaching of metal processes applicable to vocational education program in the secondary school. Metal properties; power tools; heat treating; ornamental iron work, cold metal; sheet metal; machining metals; and arc and gas welding.
405. **THE SCHOOL SHOP (3).** Organization and management of the school shop; methods and materials integrated with the study of jobs and problems basic to the teaching of skills in vocational education.
406. **PRACTICUM IN BUILDING CONSTRUCTION AND MAINTENANCE (3). LEC. 1, LAB. 4.** Application of skills and abilities needed in teaching the erections of buildings and other related structures.
407. **PRACTICUM IN ELECTRICITY (3). LEC. 1, LAB. 4.** Application of skills and abilities needed in the teaching of fundamental principles of electricity. Planning and developing projects involving an understanding of electrical principles as applied to materials selection, circuits, motors and devices; and maintenance and servicing of electrical equipment and appliances.
408. **PRACTICUM IN GENERAL SHOP (3). LEC. 1, LAB. 6.** Application of skills and abilities needed in teaching general shop skills to students and clients in school laboratories and rehabilitation centers.
409. **TEACHING ELECTRONICS IN AREA OF SPECIALIZATION (3). LEC. 1, LAB. 4.** Pr., consent of department head. Theories and practices used in school electronic laboratories; projects designed and constructed.
410. **PROGRAMS IN HOME ECONOMICS FOR THE MIDDLE SCHOOL (4). LEC. 3, LAB. 2.** Pr., admission to teacher education and FED 350 or equivalent. Principles of and experiences in designing middle school home economics programs; evaluation of instruction and programs.
411. **TEACHING HOME ECONOMICS EDUCATION (5). LEC. 4, LAB. 2.** Pr., admission to Teacher Education and FED 320 or equivalent. Methods and techniques of instruction using appropriate instructional materials; planning and evaluation of instruction for Home Economics.
412. **PROGRAMS IN HOME ECONOMICS EDUCATION (4). LEC. 3, LAB. 2.** Pr., admission to Teacher Education and FED 320 or equivalent. Principles of and experience in designing programs for home economics; evaluation of instruction and programs.
414. **PROGRAM IN AREA OF SPECIALIZATION (3). LEC. 2, LAB. 2.** Pr., admission to Teacher Education and FED 320 or equivalent. Program planning principles involved in designing program activities for specific areas of specialization.
415. **TEACHING IN AREA OF SPECIALIZATION (3-5). LEC. 2, LAB. 2.** Pr., admission to Teacher Education and FED 320 or equivalent. Understanding of curriculum content; methods and techniques of instruction using appropriate instructional materials; planning and evaluation of instruction for specific area of specialization.
419. **TRANSCRIPTION (5). LEC. 5, LAB. 5.** Pr., VED 312. Emphasis on improved production rates. Continued development of dictation speed. Transcription of letters with special features.
420. **INTRODUCTION TO INFORMATION PROCESSING (5).** Pr., VED 302. Introduction to office technology, equipment, communication skills. Use of the various office machines, including electronic calculators, transcription machines, and computers.

*The shorthand and typewriting sequence should be begun at the highest possible level because credit may be gained through advanced placement. With previous training in either, the student may enter the second, third, or fourth quarter course. If a grade of C or higher is earned, credit is given for the lower courses. If a C is not earned, advanced placement credit will not be granted. Consult with VBU staff for placement.

421. **OFFICE INTERNSHIP (10).** LAB. 20. Pr., VED 422, and senior standing. Supervised work experience.
424. **CAREER EDUCATION (4).** Pr., junior standing. Introduction of career education as a system concept encompassing the entire educational experience in K-14. Emphasis will be given to the interrelated nature of the role of the administrator, the counselor, and the classroom teacher in career education.
425. **PROFESSIONAL INTERNSHIP (15).** Pr., senior standing, admission to Teacher Education. Provides supervised, on-the-job experiences in a school, college, or other appropriate setting. Evaluation and analysis of the intern experience.
430. **INFORMATION PROCESSING SYSTEMS (5).** Pr., VED 420. Information processing applications to include electronic spreadsheets, database management, word processing, and graphics.
440. **ELECTRONIC OFFICE PROCEDURES (5).** Pr., VED 420. Overview of the electronic office, with processing procedures, administrative support and management functions, career development, and simulations.
442. **PRACTICUM IN METALWORKING PROCESSES (3).** LEC. 1, LAB. 4. The properties of metals and application of metalworking processes including machine tool, foundry, sheet-metal, and standard fabrication techniques.
444. **PRACTICUM IN ENVIRONMENTAL SYSTEMS (3).** LEC. 1, LAB. 4. Applications of theory with emphasis on design, installation, and maintenance of environmental systems in residential and light commercial structures.
446. **DIRECTED INDEPENDENT STUDY (1-10).** The student's learning efforts are guided toward desired objectives. Includes evaluation by professor and student of work accomplished at regular intervals.
450. **SPECIAL TOPICS (1-5).** Seniors and professors pursue cooperatively selected concepts and theoretical formulations.
457. **PRACTICUM IN GRAPHIC ARTS INSTRUCTION (3).** LAB. 6. Pr., junior standing. To prepare pre-service and in-service vocational teachers to teach graphic arts skills in printing and duplicating techniques, advertising, display and other modes of graphic communication.
462. **DIRECTED WORK EXPERIENCE IN AREA OF SPECIALIZATION (5).** LAB. 10. Pr., VED 414. In-service, supervised work experience. Individually designed for part-time and/or summer experience.
466. **TEACHING OUT-OF-SCHOOL GROUPS (3).** Pr., VED 414. Conducting surveys, occupational analysis, using advisory committees, organizing, conducting and supervising various types of adult education.
469. **COMMUNITY PROGRAMS IN ADULT EDUCATION (5).** LEC. 4, LAB. 2. Pr., junior standing, VED 513 or COI.
- 475-476-477-478-479-480. **TRADE AND TECHNICAL EXPERIENCE (5-5-5-5-5-5).** An experience completed by supervised employment or by examination on basis of journeyman level work experience at the maximum rate of 15 quarter hours for each year of such experience. In those occupations where there is no organized apprenticeship experience beyond the level of learner will correspond to starting the curriculum, elective coursework may be substituted for these credits.
495. **PRACTICUM (1-15).** Provides experiences closely relating theory and practice, usually carried on simultaneously.

ADVANCED UNDERGRADUATE AND GRADUATE

508. **TEACHING MECHANICAL TECHNOLOGY (5).** LEC. 3, LAB. 4. Pr., junior standing. Objectives and methods; equipment and management of vocational education shops; organization of projects; recent development in specialized areas of mechanics; in-service teaching problems. Students plan for demonstration of methods for teaching mechanical skills.
510. **OCCUPATIONAL INFORMATION (3).** LEC. 2, LAB. 2. Pr., junior standing. Occupational structure, job qualifications, and requirements, sources of occupational information, current trends, industrial and occupational surveys. Preparation, evaluation, and dissemination of occupational information.
513. **NATURE OF ADULT EDUCATION (5).** Pr., junior standing. History and principles of adult education applied to the development and implementation of programs in remedial, occupational, and continuing education.
520. **TEACHING VOCATIONAL EDUCATION TO STUDENT WITH SPECIAL EDUCATION NEEDS (5).** Pr., successful completion of program planning and methods courses. Program development resources for teaching vocational skills to students who are economically and educationally disadvantaged or handicapped.
524. **ADMINISTRATIVE MANAGEMENT (5).** Pr., junior standing. COI. Management of information in many forms, systems design, data collection and processing methods, communications and record management, office physical facilities, other performance standards and control and motivation of personnel.
541. **DEVELOPMENT OF VOCATIONAL EDUCATION (4).** Pr., junior standing. Historical perspective of the development of vocational education with an overview of its nature and purpose relative to the technological society.
552. **INSTRUCTIONAL PROGRAMS IN THE CONSTRUCTION INDUSTRY (4).** LEC. 2, LAB. 4. Pr., VED 414 or 415 or graduate standing. Preparation of teachers to implement various exploratory programs of a hands-on nature that will permit students to gain insight into career opportunities offered by the construction industry.
554. **INSTRUCTIONAL PROGRAMS IN THE MANUFACTURING INDUSTRY (4).** LEC. 2, LAB. 4. Pr., VED 414 or 415 or graduate standing. Preparation of teachers to implement various exploratory programs of a hands-on nature that will permit students to gain insight into career opportunities offered by the manufacturing industry.
556. **LEARNING RESOURCES IN AREA OF SPECIALIZATION (5).** Pr., junior standing. (A) Agricultural Education; (B) Industrial Arts Education; (C) Trade and Industrial Education; (D) Marketing Education; (F) Adult Education; (G) Technical Education; (H) Business; (I) Home Economics; and (T) Health.
558. **COORDINATION AND SUPERVISION OF VOCATIONAL EDUCATION PROGRAMS IN AREAS OF SPECIALIZATION (5).** LEC. 4, LAB. 2. Pr., junior standing. Appropriate relationship between school and on the job programs, including records of coordination, student placement, improving employable skills and habits, recruitment and selection of work experience applicants, work experience rotation, public information and other similar activities.

574. **ORGANIZATION OF INSTRUCTION IN VOCATIONAL-TECHNICAL EDUCATION (5).** Pr., junior standing. Trade and occupational analysis, principles and procedures of identifying and selecting the skills and knowledge needed in the preparation of courses of instruction. Principles and procedures of individualizing instruction.
591. **PROBLEMS IN TEACHING THE DISADVANTAGED ADULT (3-5).** Pr., junior standing. Problems of the disadvantaged adult with special emphasis on the unique sociological, psychological, and physiological factors that influence learning and participation in remedial learning activities.

GRADUATE

602. **TEACHER EDUCATION IN VOCATIONAL AND ADULT EDUCATION (5).** For supervisors of student teachers, teacher educators, and other graduate students. Major emphasis on administration of vocational education programs, research, problems which supervising teachers encounter.
603. **PROBLEMS IN AGRICULTURAL OCCUPATIONS (5).** Pr., consent of department head. Securing, organizing and interpreting information for guidance and teaching purposes; curriculum development; developing instruction units and planning teaching activities for on-farm and off-farm occupations.
606. **ORGANIZATION AND UTILIZATION OF COMMUNITY RESOURCES (5).** Pr., consent of department head. Processes through which new ideas and innovations are utilized through community organization to maximize the effective use of physical and human resources.
608. **ADMINISTRATION OF VOCATIONAL AND ADULT EDUCATION (5).** Pr., consent of department head. Preparation of professional personnel for leadership. Content includes philosophy and an application of procedures in administering and supervising new and on-going programs to meet changing socio-economic conditions.
609. **COMPREHENSIVE PLANNING FOR VOCATIONAL EDUCATION (5).** Pr., VED 608. Processes of comprehensive planning for vocational education programs at high school and post high school centers using local, state, and regional data sources.
614. **IMPLEMENTING COMMUNITY EDUCATION (5).** Integrating education within local institutions and socio-cultural movements. A review of strategies for implementing lifelong education services and for promoting a sense of community.
616. **ORGANIZING AND TEACHING ADULT, POST-SECONDARY AND CONTINUING EDUCATION (5).** Pr., COI. Utilization of principles of andragogy in helping adults who are not full-time students benefit from adult, post-secondary, and continuing education.

Each of the following courses may be taken as (A) Agriculture, (B) Industrial Arts, (C) Industrial, (D) Marketing, (F) Adult, (G) Technical, (H) Business, (I) Home Economics.

625. **INTERNSHIP (3-15).** Supervised, on-the-job experiences in a school, college, or other appropriate setting. These experiences accompanied by regularly scheduled, on-campus discussion periods for positive evaluation and analysis of the intern experience.
646. **DIRECTED INDEPENDENT STUDY (1-6).** The student's learning efforts are guided toward desired objectives including evaluation by professor and student of work accomplished at regular intervals.
650. **SEMINAR IN AREAS OF SPECIALIZATION (1-3). MAY BE REPEATED FOR CREDIT NOT TO EXCEED 10 HOURS.** Advanced graduate students and professors pursue cooperatively selected concepts and theoretical formulations.
651. **RESEARCH STUDIES IN EDUCATION IN AREAS OF SPECIALIZATION (5).** Review, analysis, and interpretation of available research with emphasis on designing new research to meet the changing needs of the school.
652. **CURRICULUM AND TEACHING IN AREAS OF SPECIALIZATION (5).** Teaching practices and reappraisal of selecting experiences and content for curriculum improvement.
653. **ORGANIZATION OF PROGRAM IN AREAS OF SPECIALIZATION (5).** Program, organization, and development of basic and supplementary materials for guiding teachers, administrators, and school systems in the continuous improvement of curriculum and teaching practices.
654. **EVALUATION OF PROGRAM IN AREAS OF SPECIALIZATION (5).** Evaluation and investigation of teaching effectiveness with attention also given to the utilization of human and material resources and the coordination of areas of specialization.

Prerequisites for the 651, 652, and 654 courses are 18 hours of appropriate subject matter and 36 hours of psychology and professional education.

695. **PRACTICUM (1-15).** Students get experiences closely relating theory and practice, usually carried on simultaneously.
696. **GRADUATE RESEARCH FORUM (1).** May be repeated, but counted only once toward graduation. Presentations by graduate students of research proposals and/or findings. Analysis of procedures and findings.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
798. **FIELD PROJECT (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.
799. **RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)** May be taken more than one quarter.

Program Designators — When appropriate, certain sections of the above common offerings are identified by programs within the departments by the use of letter designations as noted below:

(A) Agriculture, (B) Industrial Arts, (C) Industrial, (D) Marketing, (F) Adult, (G) Technical, (H) Business, (I) Home Economics, and (T) Health Occupations.

Zoology and Wildlife Science (ZY)

Professors Pritchett, *Head*, Causey, Dobie, Dusi, G. Folkerts, Mason, Mirarchi, and Wit
Associate Professors Bradley, Dixon, Holler, Lisano,
Lishak, Speake, and Williams

Assistant Professors Bain, Bart, Best, Dobson, Guyer, Hepp, Kempl,
Lawrence, Stribling, Sundermann, M.C. Wooten, and M.W. Wooten

Instructors D. Folkerts, Hays, and Wester

Adjunct Professors Crozier and Dorgan

Adjunct Associate Professors Current, Frandsen, and Heck

Adjunct Assistant Professors Simons and Stearns

BI 101, 102, and 103 are prerequisite for many courses in this department. For a description of these and other general biology courses, see the section for biology.

201. **MARINE BIOLOGY (6). LEC. 4, LAB. 4.** Pr., BI 101, 102, and 103. Summer. The invertebrates, vertebrates, and marine plants as communities with emphasis on local examples. Taught only at Dauphin Island Sea Laboratory. Credit may not be earned in both ZY 201 and 436.
205. **WILDLIFE CONSERVATION (3). LEC. 3.** Fall. The history of wildlife conservation in North America and a presentation of current wildlife conservation problems and practices.
241. **INTRODUCTION TO MARINE ZOOLOGY (6). LEC. 3, LAB. 9.** Pr., BI 101, 102, and 103. Summer. A general introduction to the Marine environment with emphasis on the local fauna. Taught only at the Gulf Coast Research Laboratory. Credit may not be earned in this course and ZY 210 or ZY 307.
250. **HUMAN ANATOMY (5). LEC. 3, LAB. 5.** Pr., BI 101 or BI 105. All quarters. The structure of the human body combined with a comprehensive study and dissection of a large mammal. Structural similarities and dissimilarities will be emphasized in the laboratory. A common laboratory section will meet one day at the lecture hour and the two-hour dissection laboratories will meet in small groups by sections.
251. **PHYSIOLOGY (5). LEC. 4, LAB. 3.** Pr., BI 103 or ZY 250. All quarters. Function of mammalian systems with emphasis on man. Laboratory exercises will provide students with an opportunity to validate functions on laboratory animals.
300. **GENETICS (5). LEC. 4, LAB. 3.** Pr., BI 101 and college algebra or equivalent. Fall, Winter, Spring. Basic genetic principles, theoretical basis for genetic systems, and modern areas of research. Laboratory emphasizes biometrical analysis of experiments using plants and animals. A common laboratory-recitation session will meet on the "fifth day" at the lecture hour, and a two-hour data collecting laboratory will meet in small groups by sections.
301. **COMPARATIVE ANATOMY (5). LEC. 3, LAB. 6.** Pr., BI 103. Winter, Summer. Comparisons of the systems of the vertebrates.
302. **VERTEBRATE EMBRYOLOGY (5). LEC. 3, LAB. 6.** Pr., BI 103. Fall, Spring. Fertilization, cleavage, morphogenesis, and organogenesis of the frog, chick, pig, and human from a descriptive and analytical viewpoint.
303. **PRINCIPLES OF EVOLUTION AND SYSTEMATICS (5). LEC. 5.** Pr., BI 102 or 103. Fall, Winter, Summer. The major processes, methods, and philosophic basis for present day concepts of evolution and systematics.
306. **PRINCIPLES OF ECOLOGY (5). LEC. 4, LAB. 3.** Pr., 10 hrs. Biology or COI. Fall, Spring, Summer. The physical and biotic factors of the environment and the interactions of these with plants and animals. The organization and functions of communities and populations.
307. **INTRODUCTION TO OCEANOGRAPHY (6). LEC. 4, LAB. 4.** Pr., college algebra, general chemistry, and general physics. Summer. The physics, chemistry, biology, and geology of the oceans. Taught only at the Dauphin Island Sea Laboratory. Credit may not be earned in both ZY 307 and ZY 435.
310. **CELL BIOLOGY (4). LEC. 4.** Pr., 10 hours of General Biology and CH 207. Fall, Winter. Morphology and physiology of cell membranes, cytoplasm, and the formed elements of the cytoplasm and nucleus. Cell division, molecular transport, cellular homeostasis, and biochemical pathways of energy production.
- 310L. **CELL BIOLOGY LABORATORY (2). LAB. 4.** Pr., ZY 310 or concurrently. Fall, Winter. Laboratory exercises in cell biology.
316. **PHYSIOLOGY OF DOMESTIC ANIMALS (5). LEC. 4, LAB. 3.** Pr., BI 103. Fall, Spring. Function of mammalian systems with emphasis on domestic mammals. Degree credit may not be earned in both ZY 316 and ZY 251 or ZY 524.
328. **PRINCIPLES OF WILDLIFE MANAGEMENT (4). LEC. 4.** Pr., a course in ecology. Fall. Fundamentals of wildlife management theory, application, and administration.
- 328L. **WILDLIFE MANAGEMENT LABORATORY (1). LAB. 3.** Pr., ZY 328 or concurrently. Fall. Laboratory experiences in wildlife management.
360. **PHYSIOLOGICAL ASPECTS OF AGING (3). LEC. 3.** Pr., BI 101. Summer. The effects of aging and disease states associated with aging upon the functional status of the various organs and systems of the body.
401. **INVERTEBRATE ZOOLOGY (5). LEC. 4, LAB. 4.** Pr., BI 103. Winter. Biology of invertebrates.
402. **NATURAL HISTORY OF VERTEBRATES (5). LEC. 4, LAB. 4.** Pr., BI 103. Natural history of fishes, amphibians, reptiles, birds, and mammals. Laboratory experience will be field technique oriented.
425. **FOREST WILDLIFE MANAGEMENT (3). LEC. 3.** Pr., FY 520 or COI. Winter. Wildlife management as applied to forest properties. Restricted to students in forestry.

433. **FISH AND WILDLIFE LAW ENFORCEMENT (3).** LEC. 3. Pr., Junior standing. Spring, odd years. History, principles, and techniques of fish and wildlife laws and enforcement. Restricted to students in Fisheries, Forestry, and Wildlife Management.
435. **GENERAL OCEANOGRAPHY (3).** LEC. 3. Pr., acceptable physics, chemistry, and mathematics background. Winter, odd years. Physical, chemical and geological characteristics of the oceans, especially as they relate to present understanding of marine ecology and the biological productivity of marine waters.
436. **MARINE BIOLOGY (3).** LEC. 3. Pr., ZY 306, 401 or equivalents. Winter, even years. Marine organisms and their adaptations to the environment and other organisms with emphasis on the ecology of marine communities.
440. **CLINICAL PHYSIOLOGY I (4).** LEC. 4. Pr., ZY 250, 251, or equivalents. Coreq., NUR 301. Fall. Consideration of the musculature, the nervous system, and the cardiovascular system. Emphasis will be on normal physiological function. Pathological conditions as alterations of normal function will be discussed. Pharmacological treatment of pathological states will be emphasized.
441. **CLINICAL PHYSIOLOGY II (4).** LEC. 4. Pr., ZY 440. Winter. Consideration of temperature regulation, kidney function, the liver, respiration, endocrinology and digestion. Emphasis will be on normal physiological function. Pathological conditions as alterations of normal function will be discussed. Pharmacological treatment of pathological states will be included.
442. **CLINICAL PHYSIOLOGY LABORATORY (1).** LAB. 3. Coreq., ZY 441. Winter. Laboratory experiences in systems physiology. Taken concurrently with ZY 441.
490. **WILDLIFE MANAGEMENT INTERNSHIP (5 HRS. PER QUARTER, 15 HRS. MAXIMUM.)** COI, SU graded. Provides the student with practical job experience under joint supervision of the Internship adviser and appropriate state, federal, or private agency. Training will prepare student for potential career employment.
498. **SPECIAL PROBLEMS (1-5).** Pr., senior standing. A. Zoology; B. Wildlife Management; C. Marine Biology. A student can register for a total of not more than five hours credit.

ADVANCED UNDERGRADUATE AND GRADUATE

509. **HISTOLOGY (5).** LEC. 3, LAB. 6. Pr., BI 103. Winter. Morphology and classification of tissues; arrangement of tissues in organs and systems of vertebrate animals.
511. **GENERAL PARASITOLOGY (5).** LEC. 3, LAB. 6. Pr., BI 103. Fall, Spring, Summer. Origin, adaptations, physiology, and ecology of parasites. Identification and life histories of representative parasitic protozoa, helminths, and arthropods with emphasis on host-parasite relationships.
515. **LIMNOLOGY (5).** LEC. 3, LAB. 6. Pr., CH 104, PS 205, BI 103. Spring. Biological, chemical, and physical factors affecting aquatic life.
516. **STUDIES IN FIELD BIOLOGY AND ECOLOGY (8).** Pr., major or minor in a biological field. COI. Offered in intervals between quarters. Students should register for the course during the quarter immediately before. Intensive field studies of an area outside Alabama. A travel fee, in addition to tuition will be charged.
517. **PRINCIPLES OF POPULATION GENETICS (5).** LEC. 4, LAB. 3. Pr., ZY 300. Spring, even years. The origin, maintenance and expression of genetic variability in natural populations. Designed especially for students planning to work with populations of organisms, whether with aspects of management, breeding, or control.
518. **MON-MENDELIAN GENETICS (3).** Pr., ZY 300. Fall. Current status of behavioral, cytogenetic, cytoplasmic, developmental, and recombinational genetics.
519. **MOLECULAR GENETICS (3).** Pr., ZY 300. Winter, even years. Current status of molecular genetics; nucleic acids, regulation, mutagenesis, and immunology will be considered.
520. **HUMAN GENETICS (5).** LEC. 5. Pr., ZY 300, CH 208. Spring, Summer. Effects of normal and abnormal chromosome complements, the biological interaction of genes, and the effects of mutation and changes in gene frequency on human populations; problems in small sample analysis, biochemical screening of human "carriers," and the prospects for genetic engineering.
524. **ANIMAL PHYSIOLOGY (5).** LEC. 4, LAB. 3. Pr., 10 hrs. Adv. ZY & Org. CH. Winter, Summer. General physiological principles common to animals of various vertebrate taxa illustrated with examples that are most demonstrative. An effort is made to include unique physiological adaptations.
527. **WILDLIFE PHILOSOPHY AND POLICY (3).** LEC. 3. Pr., A course in natural resource management. Fall. Examination of attitudes, philosophies, and policies that govern management of the wildlife resource. Modern methods used in dealing with the public to implement wildlife policies. Intended for students interested in employment with public or private agencies dealing with natural resources.
528. **WILDLIFE BIOLOGY (5).** LEC. 4. Pr., ZY 328 or concurrent. Winter. The ecology and management of selected wildlife species of the U.S. Emphasis on natural history, census methods, and management strategies.
- 528L. **WILDLIFE BIOLOGY LABORATORY (2).** LAB. 6. Pr., ZY 528 or concurrent. Winter. Practical laboratory exercises designed to acquaint the student with modern methodology and techniques in studying wild bird and mammal populations.
529. **WILDLIFE DAMAGE CONTROL (3).** LEC. 3. Pr., 10 hours of wildlife ecology and management. Winter (Alternate years.) Examination of the principles and methods for controlling problems and damage caused by wildlife. Extension and research consideration will be reviewed. Intended for students interested in employment with public or private agencies dealing with wildlife resources.
531. **WILDLIFE HABITAT ANALYSIS (3).** LEC. 1, LAB. 6. Pr., ZY 528, BY 506. Spring. Practical exercises in vegetation analysis, utilization studies, aerial photograph interpretation, and cover type mapping.

536. **COMMUNITY ECOLOGY OF MARINE ECOSYSTEMS (3).** LEC. 3. Pr., ZY 435 or COI. Spring, odd years. The ecology of coastal and oceanic ecosystems. The dynamics and regulation of population distribution and abundance within terrestrial, intertidal, and subtidal communities.
538. **GENERAL ICHTHYOLOGY (5).** LEC. 3, LAB. 6. Pr., BI 103. Fall, Survey of functional morphology, classification and distribution of fishes. Introduction to faunistic literature of North America and the world. Identification of fishes from the Gulf of Mexico and North American fresh waters.
542. **MARINE FISHERIES MANAGEMENT (6).** LEC. 3, LAB. 9. Pr., 18 hrs. of biology including BI 103. Summer. Fisheries management philosophy, objectives, problems, and principles involved in management decisions. Offered only at the Gulf Coast Laboratory, Ocean Springs, Mississippi.
543. **MARINE VERTEBRATE ZOOLOGY AND ICHTHYOLOGY (9).** LEC. 5, LAB. 12. Pr., 18 hours of biology including BI 103. Summer only. The marine chordata, including lower groups and the mammals and birds, with most emphasis on the fishes. Offered only at the Gulf Coast Research Laboratory, Ocean Springs, Mississippi.
545. **MARINE INVERTEBRATE ZOOLOGY (9).** LEC. 5, LAB. 12. Pr., 18 hrs. biology including BI 103 and ZY 501. Summer. The marine invertebrates, especially those of the Mississippi Sound region. Emphasis is placed on the structure, classification, phylogenetic relationships, and functional processes. Offered only at the Gulf Coast Laboratory, Ocean Springs, Mississippi.
548. **MARINE ECOLOGY (7.5).** LEC. 3, LAB. 6. Pr., BI 102, ZY 501, and acceptable chemistry. Summer. The relationship of marine organisms to their environment, and the effects of the environment on the abundance and distribution of marine organisms. Offered only at the Gulf Coast Laboratory, Ocean Springs, Mississippi.
550. **ZOOGEOGRAPHY OF THE VERTEBRATES (5).** LEC. 4, LAB. 3. Pr., ZY 521, or COI. Spring, odd years. Principles of geographic distribution of vertebrate animals.
551. **MARINE INVERTEBRATE ZOOLOGY (6).** LEC. 4, LAB. 4. Pr., BI 103 plus 10 hours of Zoology at the 200-level or above. Summer. The natural history, systematics, and morphology of marine invertebrates from a variety of habitats in the Gulf of Mexico, oriented toward a field and laboratory approach. Participation in extended field trips is part of the course. Taught only at the Dauphin Island Sea Lab.
553. **MARINE VERTEBRATE ZOOLOGY (6).** LEC. 4, LAB. 4. Pr., BI 101, 103 and COI. Summer. The systematics, zoogeography, and ecology of marine fishes, reptiles, and mammals. Taught only at the Dauphin Island Sea Laboratory. This course may not be substituted for ZY 521 and/or ZY 522.
554. **COASTAL ORNITHOLOGY (6).** LEC. 3, LAB. 9. Pr., ZY 522. Summer. Coastal and pelagic birds with emphasis on ecology, taxonomy, and distribution. Taught only at the Dauphin Island Sea Laboratory. This course may not be substituted for ZY 605.
555. **MARINE ECOLOGY (6).** LEC. 3, LAB. 9. Pr., ZY 306, college physics and chemistry, and COI. Summer. Bioenergetics, community structure, population dynamics, predation, competition, and speciation in marine eco- systems. Taught only at the Dauphin Island Sea Lab.
556. **BEHAVIOR AND NEUROBIOLOGY OF MARINE ANIMALS (6).** LEC. 5, LAB. 10. Pr., 20 hours of Zoology, Psychology, and COI. Survey of the behavior, neuroanatomy, and neurophysiology of selected marine invertebrates and vertebrates. Taught only at the Gulf Coast Research Laboratory.
558. **MARINE BIOLOGY FOR TEACHERS (9).** LEC. 12, LAB. 18. Pr., BI 101, 102, 103; COI. Summer. Introduction to the marine environment and marine organisms, their behavior and ecology, for teachers. Taught at the Dauphin Island Sea Lab. This is a five-week course.
560. **MAMMALIAN PHYSIOLOGY I (5).** LEC. 4, LAB. 3. Pr., CH 208, ZY 250 or equivalent, and ZY 310 or Biochemistry. Fall, Spring. A treatment of cellular bioelectric phenomena, muscle contractility, neurophysiology, and cardiovascular physiology. Laboratory will utilize modern methodology for the observation of physiological fact.
561. **MAMMALIAN PHYSIOLOGY II (5).** LEC. 4, LAB. 3. Pr., ZY 560 or equivalent. Winter, Summer. A continuation of ZY 560 with emphasis upon respiratory, renal, digestive, metabolic, and endocrine physiology.
565. **ETHOLOGY (5).** LEC. 4, LAB. 3. Pr., ZY 306, 522, 524 or COI. Spring. Animal behaviors, analysis of their adaptive values, development, and evolution.
574. **HERPETOLOGY (5).** LEC. 3, LAB. 6. Pr., 15 hours of biology beyond the freshman level. Spring, Summer. Systematics, ecology, and behavior of amphibians and reptiles.
575. **ORNITHOLOGY (5).** LEC. 3, LAB. 6. Pr., 15 hours of biology beyond the freshman level. Spring. Systematics, ecology, and behavior of birds.
576. **MAMMALOLOGY (5).** LEC. 3, LAB. 6. Pr., 15 hours of biology beyond the freshman level. Winter. Systematics, behavior, and ecology of mammals.
590. **SPECIAL TOPICS IN MARINE BIOLOGY (1-5) Pr., COI.** Comprehensively directed studies relating to marine biology. Taught at the Dauphin Island Sea Lab.

GRADUATE

604. **ADVANCED HERPETOLOGY (5).** LEC. 4, LAB. 3. Pr., ZY 574 or equivalent. An intensive investigation of current literature and relevant research dealing with amphibians and reptiles.
605. **ADVANCED ORNITHOLOGY (5).** LEC. 4, LAB. 3. Pr., ZY 575 or equivalent. Spring. An intensive investigation of the current literature and relevant research dealing with birds.
606. **ADVANCED MAMMALOLOGY (5).** LEC. 4, LAB. 3. Pr., ZY 576 or equivalent. An intensive investigation of the current literature and relevant research dealing with mammals.
607. **UPLAND WILDLIFE ECOLOGY (5).** LEC. 3, LAB. 6. Pr., BY 506, BY 513, ZY 528, or COI. Fall, odd years. Application of wildlife ecological theories, techniques, and administration with special emphasis on upland species. Field trips will be made, including at least 4 overnight weekend trips.

608. **FOREST WILDLIFE ECOLOGY (5). LEC. 5. Pr., ZY 528.** Summer, even years. Intensive investigations into current aspects of the ecology and management of the important forest wildlife species of North America.
609. **CONSERVATION BIOLOGY (3). LEC. 3.** Spring, odd years. Examination of practical and theoretical issue in the conservation and maintenance of biological diversity and the recovery and management of endangered species. Course will consist of formal lectures as well as discussion of current conservation problems.
618. **ADVANCED INVERTEBRATE ZOOLOGY (5). LEC. 3, LAB. 6. Pr., ZY 401 or equivalent.** Spring, odd years. Biology of the invertebrate phyla with special emphasis on minor phyla, collection, and identification.
619. **COMPARATIVE INVERTEBRATE PHYSIOLOGY (5). LEC. 4, LAB. 3. Pr., ZY 501 and COI.** Spring, odd years. The physiological mechanisms of invertebrates with special emphasis on respiration, excretion, reproduction, locomotion, nutrition, circulation, and behavior.
623. **ORGANIC EVOLUTION (5). Pr., ZY 300.** Fall. Evolutionary principles as illustrated by the various biological disciplines, particularly genetics, paleontology, zoogeography, and systematics in general.
627. **IMMUNOLOGY AND PHYSIOLOGY OF PARASITES (5). LEC. 3, LAB. 6. Pr., ZY 511, BY 300, ZY 524, and COI.** Spring, odd years. Immunity mechanisms to infections of protozoan and helminth parasites. Chemical physiology of host-parasite relationship to include nutrition, metabolism, toxicity, and chemotherapy.
629. **EVOLUTIONARY GENETICS (3). LEC. 3. Pr., ZY 300.** Spring, odd years. The genetic architecture of natural populations as it relates to evolution, and population biology.
630. **ADVANCED GENETICS (5). Pr., ZY 300 and ZY 518.** Winter, odd years. Non-Mendelian hereditary systems; regulation of gene action as it influences growth, differentiation, and development; and the status of contemporary genetics research.
631. **DEVELOPMENTAL GENETICS (3). Pr., ZY 300, ZY 302, ZY 519, Coreq. ADS 519.** Winter, odd years. Gene action on the biochemical level pertaining to early development, growth and differentiation, and aging. Principles of gene regulation and organization derived from both prokaryotic and eukaryotic systems are discussed.
632. **HELMINTHOLOGY (5). LEC. 3, LAB. 6. Pr., ZY 511.** Spring, even years. Advanced morphology, physiology, life cycles, and host-parasite relationships of helminths. Opportunity for making extensive literature studies and collections of the parasites of a particular group of animals in which the student is most interested.
634. **PROTOZOOLOGY (5). LEC. 3, LAB. 6. Pr., ZY 310 and 511 or equivalents.** Winter, alternate years. Free-living and parasitic protozoa important to agriculture, wildlife, and man. Morphology, cell biology, reproduction, ecology, and life histories are emphasized.
635. **WATERFOWL BIOLOGY AND MANAGEMENT (5). LEC. 3, LAB. 6. Pr., ZY 528.** Winter, even years. Taxonomy, biology, and management of waterfowl of the world; emphasis on North American species.
636. **POPULATION ECOLOGY (5). LEC. 5. Pr., ZY 306.** Winter. Structure, dynamics, and natural regulatory mechanisms of animal populations; survival strategies emphasizing reproduction, competition, and adaptations to environmental changes.
637. **STREAM ECOLOGY (3). LEC. 2, LAB. 3. Pr., FAA 515 or 624 or COI.** Fall. Physical, chemical, and biological aspects of river and stream ecosystems emphasizing aquatic resource management and impact assessment.
644. **PHYSIOLOGY OF THE CELL (3). Pr., ZY 310 and 524.** Winter, even years. Basic physiological processes at the cellular level with the tools and approaches of physical science.
647. **ENDOCRINOLOGY (5). Pr., ZY 524 and ADS 519.** Spring. A comprehensive treatment of the classical and modern literature of endocrinology.
649. **PHYSIOLOGICAL ECOLOGY (4). LEC. 3, LAB. 3. Pr., ZY 524 or COI.** Spring, even years. The physiological adaptations of animals to the specific physical and biotic environments in which they live.
650. **PROBLEMS IN MARINE ANIMAL PHYSIOLOGY (6). LEC. 4, LAB. 6. Pr., cell physiology or biochemistry and COI.** Comparative physiology of marine animals, stressing biochemical mechanisms of osmoregulation, temperature control and respiration. Taught at Dauphin Island Sea Lab.
651. **OCEANOLOGY OF THE GULF OF MEXICO (5). LEC. 3, LAB. 4. Pr., a course in oceanography and COI.** The oceanology of the Gulf of Mexico and adjacent waters. The areas of study will include the coastal zone, continental shelf and deep ocean. Taught at Dauphin Island Sea Lab.
652. **MARINE ZOOGEOGRAPHY (5). LEC. 3, LAB. 6. Pr., a course in marine biology and COI.** Historical, physical and biological factors influencing the distribution of marine organisms. Emphasis: the Western North Atlantic. Taught in Dauphin Island Sea Lab.
653. **ESTUARINE SCIENCE (6). LEC. 6, LAB. 6. Pr., COI.** The physical, chemical, and biological parameters of estuarine ecosystems indepth. Structured to provide field experience in addition to lecture material. Taught at Dauphin Island Sea Lab.
670. **TROPICAL BIOLOGY: AN ECOLOGICAL APPROACH (12). LEC. 6, LAB 12. Pr., 20 hours of biological courses at or above the 500 level.** Winter, Summer. An indepth introduction to the principles of ecology as they operate in the tropics. Orientation and introductory lectures in San Jose, Costa Rica, followed by field work of 2-10 days at each of six or more contrasting tropical sites.
671. **TROPICAL AGRO ECOLOGY (12). LEC. 6, LAB. 12. Pr., 20 hours of agricultural or biological sciences.** Summer. A focus on the application of ecological principles to tropical agricultural systems with emphasis on research training. Designed for students with a broad range of backgrounds from basic ecology to various agricultural sciences. After orientation in San Jose, Costa Rica, class will operate in the field at three main habitats.

690. **SPECIAL TOPICS IN ZOOLOGY AND WILDLIFE SCIENCE (1-5).** Pr., COI. Comprehensively directed studies relating to the zoological and wildlife science areas. A. Cell Biology; B. Community Ecology; C. Ecology; D. Herpetology; E. History of Zoology; F. Ichthyology; G. Insect Hormones and Development; H. Mammalogy; I. Marine Biology; J. Neurobiology; K. Ornithology; L. Systems Physiology; M. Wildlife Biology; N. Wildlife Habitat Analysis; O. Wildlife Philosophy, Policy, Public Relations; P. Genetics; Q. Developmental Biology; R. Wildlife Damage Control; S. Histology; T. Parasitology; U. Population Genetics; V. Human Genetics; W. Molecular Genetics; X. Animal Behavior.
693. **SEMINAR (1).** All quarters. Required of master's students. Oral presentation and discussion of research in the field of specialization.
695. **SPECIAL PROBLEMS IN COASTAL ZONE BIOLOGY (1-5).** All quarters. Supervised research problems in marine biology. Offered only at the Dauphin Island Sea Laboratory.
698. **SPECIAL PROBLEMS (2-5).** All quarters. A. Zoology; C. Wildlife Science. Numerous study areas are available under each of these categories. Consult individual faculty member before registering.
699. **RESEARCH AND THESIS (CREDIT TO BE ARRANGED.)**
790. **SPECIAL TOPICS IN ZOOLOGY AND WILDLIFE SCIENCE (1-5).** Pr., COI. Comprehensively directed studies relating to the zoological and wildlife science areas. A. Cell Biology; B. Community Ecology; C. Ecology; D. Herpetology; E. History of Zoology; F. Ichthyology; G. Insect Hormones and Development; H. Mammalogy; I. Marine Biology; J. Neurobiology; K. Ornithology; L. Systems Physiology; M. Wildlife Biology; N. Wildlife Habitat Analysis; O. Wildlife Philosophy, Policy, Public Relations; P. Genetics; Q. Developmental Biology; R. Wildlife Damage Control; S. Histology; T. Parasitology; U. Population Genetics; V. Human Genetics; W. Molecular Genetics; X. Animal Behavior.
793. **DOCTORAL SEMINAR (1).** All quarters. Required of doctoral students. Oral presentation and discussion of research in the field of specialization.
798. **DOCTORAL SPECIAL PROBLEMS (2-5).** All quarters. A. Zoology; B. Wildlife Science. Numerous study areas are available under each of these categories. Consult individual faculty member before registering.
799. **DOCTORAL RESEARCH AND DISSERTATION (CREDIT TO BE ARRANGED.)**

Faculty and Staff

1989-90

(The parenthetical designation after a faculty member's title indicates his department. The first date after the title indicates the year of first appointment to any position in the institution; the second, the year of appointment of present rank.)

GENERAL ADMINISTRATIVE OFFICERS

- MARTIN, JAMES E.**, *President & Professor (Agri. Econ. & Rural Sociology)*, 1984. B.S., Auburn; M.S., N. Carolina State; Ph.D., Iowa State
- EMERT, GEORGE H.**, *Executive Vice President & Director, Affirmative Action/Equal Employment Office*, 1984. B.A., Colorado; M.A., Colorado State; Ph.D., Va. Tech
- BARNES, PAT H.**, *Vice President for Student Affairs*, 1985. B.A., Texas Woman's; M.Ed., Ed.D., Auburn
- HENRY, RONALD J.**, *Vice President for Academic Affairs*, 1989. B.S., Ph.D., Queens (Belfast)
- PARKS, PAUL F.**, *Vice President for Research & Professor (Animal & Dairy Sciences)*, 1965, 1981. B.S., M.S., Auburn; Ph.D., Texas A&M
- RILEY, RHETT E.**, *Vice President for Business & Finance*, 1963, 1985. B.S., Auburn
- THOMPSON, ANN E.**, *Vice President for Extension & Director, Alabama Cooperative Extension Service*, 1984, 1986. B.S., Auburn; M.A., Maryland; Ed.D., Oklahoma State
- DYE, PATRICK F.**, *Director, Athletics & Head Football Coach*, 1981. B.S., Georgia
- FROBISH, LOWELL T.**, *Director, Agricultural Experiment Station*, 1986. B.S., Illinois; M.S., Ph.D., Iowa State
- LEISCHUCK, EMILY R.**, *Assistant to the Board of Trustees & President*, 1974, 1983. B.S., Alabama; M.Ed., Auburn
- LEISCHUCK, GERALD S.**, *Director, Planning & Analysis*, 1962, 1966. A.B., M.A., N. Colorado; Ed.D., Auburn
- SAMFORD, THOMAS D., III**, *University General Counsel*, 1988. A.B., Princeton; J.D., Alabama
- SMITH, JERRY F.**, *Executive Director, Alumni & Development*, 1971, 1985. B.S., Auburn; M.Ed., Livingston
- WHITE, J. HERBERT**, *Director, University Relations*, 1960, 1983. B.S., Auburn
- WILSON, E. HAMILTON**, *Director, Governmental Affairs*, 1985. B.S., Auburn

ACADEMIC ADMINISTRATIVE OFFICERS AND FACULTY

- MARION, JAMES E.**, *Dean of Agriculture*, 1980. B.S., Berea; M.S., Kentucky; Ph.D., Georgia
- PARKER, RAY K.**, *Dean & Professor of Architecture*, 1988. B.Arch., Auburn; B.S.C., Arizona State; M.S.C., Rice
- BELLENGER, DANNY K.**, *Dean of Business*, 1989. B.S., M.Sc., Ph.D., Alabama
- SCEBBA, J. BOYD**, *Acting Dean of Education*, 1988. B.S., M.A., Austin Peay; Ed.D., Auburn
- WALKER, WILLIAM F.**, *Dean of Engineering*, 1988. B.S., M.S., Texas; Ph.D., Oklahoma State
- THOMPSON, EMMETT F.**, *Dean & Professor of Forestry*, 1977, 1985. B.S., Oklahoma State; M.S., N. C. State; Ph.D., Oregon State
- HENTON, JUNE M.**, *Dean of Human Sciences & Professor (Fam. & Child Dev.)*, 1985. B.S., Oklahoma State; M.S., Nebraska; Ph.D., Minnesota
- RICHARDS, MARY P.**, *Dean of Liberal Arts*, 1988. B.A., SMU; M.A., Ph.D., Wisconsin-Madison
- KITCHENS, EDETH K.**, *Dean of Nursing*, 1989. B.S.N., UAH; M.S.N., UAB; Ph.D., Alabama
- LEGG, J. IVAN**, *Dean of Sciences & Mathematics*, 1987. B.A., Oberlin; Ph.D., Michigan
- CAMPBELL, WILLIAM H.**, *Dean of Pharmacy*, 1988. B.S., M.S., Oregon State; Ph.D., Purdue
- VAUGHAN, JOHN T.**, *Dean of Veterinary Medicine*, 1974, 1977. D.V.M., M.S., Auburn
- DOORENBOS, NORMAN J.**, *Asst. Vice President, Academic Affairs & Dean & Professor, Graduate School*, 1986. B.S., M.S., Ph.D., Michigan
- ABBETT, VANCE N.**, *Adjunct Instructor (Political Science)*, 1986, 1987. B.S., Troy State; J.D., Jones School of Law
- ABERNETHY, AVERY M.**, *Assistant Professor (Mktg. & Transp.)*, 1988. B.S., B.A., N. Carolina; Ph.D., S. Carolina
- ADAMS, JAMES W.**, *Associate Professor (Market & Transp.)*, 1969. B.B.A., M.B.A., D.B.A., Georgia State
- ADAMS, JUDITH A.**, *Librarian III, Library*, 1986. B.A., Wilkes; M.S.L.S., Syracuse; M.A., Lehigh
- ADAMS, MARY H.**, *Admissions Counselor, Admissions Office*, 1987. B.A., Auburn
- ADAMS, MURRAY, JR.**, *Associate Professor & Head (Soc. & Anthro. & Social Work)*, 1964, 1979. B.A., M.A., Mississippi; Ph.D., Kentucky
- ADERHOLDT, ROBERT W.**, *Professor (Build. Sci.)*, 1969, 1983. B.M.E., Auburn; M.S.M.E., Auburn; Ph.D., Ga. Tech
- ADKINS, KENNETH N.**, *Instructor (Mktg. & Transp.)*, 1988. B.A., Methodist; M.B.A., Florida Inst. Tech
- ALBEE, RICHARD D.**, *Art Director, University Relations*, 1986. B.F.A., Auburn
- ALBERTSON, PATRICIA**, *Management Specialist, Ext. Affairs/ATAC*, 1988. B.S., Juniata; M.B.A., Pennsylvania
- ALBRECHT, ULRICH F.**, *Assistant Professor (Math-ACA)*, 1984. B.S., M.S., Essen; Ph.D., New Mexico State; D.Habil., Duisburg
- ALDERMAN, C. WAYNE**, *Coopers & Lybrand Professor (Accountancy)*, 1977, 1988. B.S., M.B.A., Auburn; D.B.A., Tennessee
- ALDRIDGE, M. DAYNE**, *Associate Dean (Engineering) & Director, EES & Prof. Eng. Admin.*, 1984, 1988. B.S., W. Virginia; M.E.E., D.Sc., Virginia
- ALEXANDER, DAVID E.**, *Associate Professor (Music)*, 1972, 1984. B.M., M.M., Texas
- ALEXANDER, MARGARET K.**, *Librarian II (Library)*, 1987. B.S., M.Ed., Tuskegee; M.S.L.S., Catholic

- ALEXANDER, MILTON J., *Professor (Management)*, 1968, 1975. B.S., Illinois; M.B.A., St. Louis; D.B.A., Georgia State
- ALEXANDER, VANCE L., *Assoc. Professor (Clin. Pharm. Prac.)*, 1975, 1981. B.S., M.S., Houston, J.D., Birmingham School of Law
- ALEXANDER, VANESSA, *Instructor (Pharmacy Care Systems)*, 1989.
- ALFORD, WILLIAM L., *Associate Dean (Sciences & Math) & Director, Nuclear Sc. Ctr.*, 1952, 1986. B.A., Vanderbilt; M.S., Ph.D., California Tech
- ALLEN, ELIZABETH G., *Associate Professor (Curr. & Teach.)*, 1969, 1975. B.A., Alabama; M.Ed., Ph.D., S. Mississippi
- ALLEN, MARTHA S., *Associate Director, VP-Research*, 1987, 1988. B.S., M.A., Alabama; Ed.D., Auburn
- ALLEY, ALVIN D., *Professor (Curr. & Teach.)*, 1966, 1980. B.A., M.A., Ph.D., FSU
- ALLGOOD, SCOT M., *Assistant Professor (Fam. & Child Dev.)* 1988. B.S., Weber State; M.S., Montana State; Ph.D., Brigham Young
- ALVERSON-EILAND, LINDA, *Assistant Professor (Psychology)*, 1988. B.S., Samford; M.S., Ph.D., Auburn
- ALVERSON, WILLIAM J., JR., *Assistant Dean (Agriculture)*, 1965, 1983. B.S., M.Ed., Auburn
- ANDELSON, ROBERT V., *Professor (Philosophy)*, 1965, 1973. A.B. equiv., Chicago; A.M., Ph.D., S. Calif.
- ANDERSON, GLENN A., *Humanities Ref. Librarian & Librarian II (Library)*, 1978. B.A., M.A., SUNY; M.L.S., FSU
- ANDERSON, SETH C., *Assistant Professor (Finance)*, 1987. B.A., Birmingham-Southern; M.B.A., AUM; Ph.D., N. Carolina
- ANGARANO, DONNA W., *Associate Professor (S. An. Sur. & Med.)*, 1986. B.S., D.V.M., Missouri
- ANGEL, KENNETH L., *Resident (L. An. & Surg.)*, 1986. D.V.M., Georgia
- APPEL, ARTHUR G., *Assistant Professor (Entomology)*, 1985. B.A., U.C.L.A.; M.S., Ph.D., Cal at Riverside
- ARAFEH, BASSELL, *Assistant Professor (Cmpt. Sc. Engr.)*, 1986. B.S., Cairo-Egypt; M.E.E.E., Ph.D., Texas A&M
- ARMENAKIS, ACHILLES A., *Associate Dean, Extern. Affairs (Business) & Professor (Management)*, 1973, 1986. B.S., M.B.A., Louisiana Tech.; D.B.A., Miss. State
- ARRINGTON, MATTIE R., *Instructor (Curr. & Teach.)* 1989. B.A., Tuskegee; M.Ed., UAB
- ASKEW, JAMES C., *Asst. Supt. of Grounds*, 1983, 1986. B.A., Alabama; B.S., M.S., Auburn
- ASKEW, RAYMOND F., *Professor (Physics)*, 1972, 1985. B.S., Birmingham-Southern; M.S., Ph.D., Virginia
- ASMUTH, JOHN C., *Head Swimming Coach, Athletic Dept.*, 1980, 1982. B.A., Auburn
- ASMUTH, SHAWN C., *Director, Accts. Payable*, 1981, 1987. B.S., Auburn
- ATKINS, GEORGE A., *Associate Dir., Alumni Affairs*, 1982, 1986. B.S., Auburn
- ATKINS, LEAH R., *Director, Center for Arts & Humanities*, 1985. B.S., M.A., Ph.D., Auburn
- ATKINSON, ROBERT L., *Librarian II, Library*, 1988. B.A., Mississippi; M.L.S., Vanderbilt
- AULL, JOHN L., *Professor (Chemistry)*, 1974, 1985. A.B., N. Carolina; Ph.D., N. Carolina State
- AULL, JUDY C., *Undergraduate Counselor (Cmpt. Sc. & Engr.)*, 1984. B.A., Auburn
- AULT, RICHARD W., *Assistant Professor (Economics)*, 1983. B.A., W. Virginia; Ph.D., Virginia
- AVERY, ARTHUR W., *Associate Dean, Human Sci. Research & Grad. Studies & Professor (Fam. & Child Dev.)*, 1986. B.S., M.S., Ph.D., Penn. State
- AVERY, A. HENRY, *Assistant Director, Engr. Extension*, 1972. B.M.E., Auburn; M.S.I.M., Purdue
- AYERS, F. KEITH, *Editor, News Bureau, University Relations*, 1984, 1987. B.A., Auburn
- BADURA, CATHY H., *Associate Editor (Philosophy)*, 1988. B.A., Tift; M.A., Auburn
- BAGINSKI, MICHAEL E., *Assistant Professor (Elec. Engr. j.)*, B.S., M.S.E.E., Ph.D., Penn. State
- BAGINSKI, THOMAS A., *Assistant Professor (Elec. Engr. j.)*, 1984. B.S., M.S., Ph.D., Penn. State
- BAGWELL, JAMES E., *Adjunct Associate Professor (Geography)*, 1950, 1956. B.S., M.S., N. Carolina
- BAILEY, ELIZABETH G., *Assistant Director II, Alumni*, 1980, 1987.
- BAILEY, THOMAS L., *Resident (L. An. Surg. & Med.)*, 1985. B.S., Miss. State; D.V.M., Auburn
- BAILEY, WILFORD S., *President Emeritus & University Professor (Pathobiol.)* 1942, 1984. D.V.M., M.S., Auburn; Sc.D., Johns Hopkins
- BAIRD, HAL, *Baseball Coach, Athletic Dept.*, 1984. B.S., Ed.M., East Carolina
- BAIRD, SAMERA, *Assistant Professor (Rehab. & Spec. Ed.)* 1895, 1987. B.S., M.A., Tennessee; Ph.D., Texas
- BAIRD, WILLIAM E., *Assistant Professor (Curr. & Teach.)*, 1985. M.S., B.S., Tennessee; Ph.D., Texas
- BAKER, CLINTON A., *Professor (Market. & Transp. j.)*, 1974. B.S., Louisville; M.B.A., D.B.A., Indiana
- BAKER, JAQUELINE J., *Contract Specialist, Admin-VP Research*, 1985.
- BAKER, R. TERRY, *Professor (Chemical Engr. j.)*, 1986. A.R.I.C., Liverpool Poly
- BAKER, RICHARD A., *Professor & Head (Voc. & Adult Ed.)*, 1963, 1978. B.S., M.S., Ed.D., Oklahoma State
- BALACHANDRAN, SAROJINI, *Librarian III, Library*, 1988. B.Sc., M.A., Madras; M.S.L.S., Illinois; M.S., Indiana State
- BALDWIN, STEWART L., *Assistant Professor (Math-FAT)*, 1981. B.A., Ph.D., Colorado
- BANCROFT, WILLIAM B., *Instructor (English)*, 1988. B.A., Covant; M.A., Auburn; Ph.D., California
- BANKS, BARBARA Y., *Specialist, Alumni*, 1974, 1985.
- BANNON, SUSAN H., *Assistant Professor (EFLT)*, 1985. B.S., M.Ed., Auburn; Ed.D., LSU
- BARKER, KENNETH N., *Professor & Head (Pharmacy Care Systems)*, 1975, 1977. B.S.P., Florida; Ph.D., Mississippi
- BARKER, LARRY L., *Professor (Speech Comm. j.)*, 1976. A.B., M.A., Ph.D., Ohio
- BARKER, WANDA, *Head, Data Processing & Student Info. Svc.*, 1975, 1982
- BARNES, PATSY H., *Vice President of Student Affairs*, 1985. B.A., Texas Woman's U.; M.Ed., Ed.D., Auburn
- BARNES, PETER A., *Walter Professor (Physics)*, 1970, 1984. B.A.Sc., M. Sc., Waterloo; Ph.D., Simon Fraser U.-British Columbia
- BARNES, SHIRLEY L., *Counselor (Stu. Dev. Svcs.)*, 1988. B.A., Auburn; M.Ed., Tuskegee
- BARNETT, ANDY H., *Associate Professor (Economics)*, 1982. B.A., Presbyterian; M.A., Clemson; Ph.D., Virginia
- BARONE, LINDA M., *Intern (L. An. Surg. & Med.)*, 1988. B.S., Virginia Tech; D.V.M., Ohio State
- BARRETT, BEVERLY A., *Instructor (Consumer Affairs)*, 1988. B.S., Northern Michigan; M.S., Wisconsin
- BARROW, DEBORAH J., *Assistant Professor (Political Science)*, 1986. B.A., M.A., Ga. State; Ph.D., Emory
- BARRY, MARY E., *Associate Professor (Cons. Aff.)*, 1973, 1983. B.S., St. Joseph; M.S., New York U.; Ed.D., Temple
- BART, HENRY L., *Assistant Professor (Zool.-Wildlife Sci.)* 1988. B.S., M.S., New Orleans; Ph.D., Oklahoma
- BARTELS, JAN E., *Professor & Head (Radiology)*, 1967, 1978. B.S., Oregon St.; D.V.M., Washington St.; M.S., Guelph

- BARTLETT, RANDALL N., *Visiting Scholar (Ind. Design)*, 1988. B.IND., Auburn
- BASS, DAVID M., *Program Coordinator, Admissions*, 1988. B.S., M.Ed., Auburn
- BEALS, HAROLD O., *Associate Professor (Forestry)*, 1960, 1969. B.S.F., M.S., Ph.D., Purdue
- BEAMISH, JULIA O., *Assistant Professor (Cons. Aff.)*, 1983. B.S., E. Carolina; M.Ed., UNC-Greensboro; Ph.D., Va. Tech
- BEARD, ATHA, *Assistant Professor (Accountancy)*, 1965, 1969. B.S., M.B.A., Auburn
- BEARD, THOMAS R., *Assistant Professor (Economics)*, 1988. B.A., Tulane; Ph.D., Vanderbilt
- BEATY, ROBERT E., *Assistant Professor (Elec. Eng.)*, 1988. B.S.E.E., M.S.E.E., Ph.D.E.E., Purdue
- BEAUDOIN, ROBERT E., *Assistant Professor (Math-FAT)*, 1984. B.S., Clemson; A.M., Ph.D., Dartmouth
- BECK, DIANE E., *Associate Professor (Clinical Pharm.)*, 1979, 1985. B.S., Pharm. D., Florida
- BECKER, THEODORE, *Professor & Head (Political Science)*, 1988. B.S., J.D., Rutgers; M.S., Maryland; Ph.D., Northwestern
- BECKETT, ROYCE E., *Professor (Mech. Engr.)*, 1977. B.S., M.E., M.S., Illinois; Sc.D., Washington (St. Louis)
- BECKETT, S. DWAYNE, *Associate Dean (Vet. Med.)*, 1966, 1981. B.S., Miss. State; D.V.M., M.S., Auburn; Ph.D., Missouri
- BECKWITH, GUY V., *Associate Professor (History)*, 1978, 1980. B.A., M.A., Ph.D., California-Santa Barbara
- BECKWITH, WILLIAM H., *Ticket Manager of Athletics*, 1951, 1972. B.S., Auburn
- BEIL, RICHARD O., *Assistant Professor (Economics)*, 1988. B.B.A., Texas Tech; M.S., N. Texas State; Ph.D., Texas A&M
- BELL, C. REBECCA, *Specialist, Student Housing*, 1984, 1988. B.A., M.Ed., Auburn
- BELL, LANSFORD C., *Professor (Civil Engr.)*, 1973, 1979. B.S., M.S., Maryland; Ph.D., Vanderbilt
- BELL, SIDNEY C., *Professor (Ag. Ec. & Rural Soc.)*, 1956, 1971. B.S., M.S., Auburn; Ph.D., Michigan St.; J.D., Jones Law
- BELSER, THOMAS A. JR., *Professor (History)*, 1957, 1968. B.A., M.A., Ph.D., Vanderbilt
- BENEFIELD, LARRY D., *Alumni Professor (Civil Engr.)*, 1979, 1985. B.S.C.E., M.S.C.E., Auburn; Ph.D., Va. Tech
- BENGSTON, D. SUSAN, *Librarian II, Library*, 1988. B.S., UCLA; M.S., M.L.S., BYU
- BENGSTON, EDWIN J., *Assistant Professor (HHP)*, 1970. B.S., M.S., Springfield
- BENNETT, DANIEL D., *Professor & Head (Architecture)*, 1988. B.A., Auburn; M.A., Rice
- BENNETT, DONNA V., *Research Associate & Instructor (Mathematics)*, 1977, 1978. B.A., Vanderbilt
- BENNETT, ROY E., *Associate Professor (Music)*, 1978. B.M.Ed., Stetson; M.M., D.M.A., LSU
- BENTLEY, JOHN F., *Resident (S. An. Sur. & Med.)*, 1987. B.A., Berry; D.V.M., Auburn
- BERGER, BRUCE A., *Associate Professor (Phar. Care Syst.)*, 1982, 1984. B.S., M.S., Ph.D., Ohio State
- BERNARD, NANCY M., *Assistant Coord. Placement, Student Dev. Svc.*, 1982, 1984. B.S., M.Ed., Auburn
- BEST, STEVE R., *Engineer, Space Power Institute*, 1985. B.S., Auburn
- BEST, TROY L., *Assistant Professor (Zool.-Wildlife Sci.)*, 1988. B.S., Eastern New Mexico; M.S., Ph.D., Oklahoma
- BEVERLY, F. STEVE, *Editor, Rdo.-TV Svc., Univ. Relations*, 1986. A.B.J., Georgia
- BHAVNANI, SUSHIL H., *Assistant Professor (Mech. Engr.)*, 1987. B.S., Bangalore; M.S., Indian Inst. of Tech.-Bombay; Ph.D., Iowa State
- BIGGS, LINDY B., *Assistant Professor (History)*, 1988. B.A., M.A., Missouri; Ph.D., MIT
- BILLARD, JEAN-PIERRE, *Visiting Scientist (Poultry Science)*, 1989. D.Sc., Tours (France)
- BIRD, R. CURTIS, *Assistant Professor (Pathobiol.)*, 1985. B.S., McMasters; Ph.D., Toronto
- BISHOP, BARBARA A., *Librarian II, Library*, 1988. B.A., M.A., S. Florida
- BISHOP, GRACE S., *Instructor (English)*, 1988. B.A., M.A., Auburn
- BITTNER, ENID, *Assistant Professor (Geology)*, 1982, 1983. B.S., Ft. Lewis; Ph.D., Idaho
- BLACK, CHRISTINE E., *Library Associate, Library*, 1981, 1987. B.S., Alabama State
- BLACK, JT., *Professor (Ind. Engr.)*, 1984. B.S.I.E., Lehigh; M.S.I.E., W. Virginia; Ph.D., Illinois
- BLACKBURN, AMY A., *Instructor (Art)*, 1988. M.F.A., M.F.A., Colorado
- BLACKBURN, JACK E., *Associate Vice President for Academic Affairs*, 1989. B.S., FSU; M.A., Peabody; Ed.D., New York
- BLACKWELL, GAINES T., *Professor (Architecture)*, 1974, 1980. B.A., Alabama; M.F.A., Georgia
- BLAGBURN, BYRON L., *Associate Professor (Pathobiol.)*, 1982, 1986. B.S., M.S., Andrews; Ph.D., Illinois
- BLAKE, BRUCE D., *Academic Adviser (Liberal Arts)*, 1946, 1982. B.A., Auburn
- BLAKE, JOHN R., *Accountant, Gen. Fin. & Acct.*, 1983. B.S., Auburn
- BLAKENEY, LARRY C., *Assistant Football Coach, Athletic Department*, 1977. B.S., Auburn
- BLAKNEY, WILLIAM G., *Associate Professor (Ind. Engr.)*, 1958, 1961. B.S., Nova Scotia Tech.; M.Sc., Ohio State
- BLANKS, GEORGE W., *Associate Director, Housing*, 1988. B.A., Samford; M.A., UAB
- BLESSING, DANIEL L., *Assistant Professor (HHP)*, 1980. B.A., St. Leo; M.A., Alabama; Ph.D., LSU
- BLEVINS, JEANNE K., *Instructor (EFLT)*, 1989. B.S., Old Dominion; M.S., Virginia
- BLOCK, DENNIS H., *Assistant Director, Water Resources Research Institute*, 1984. B.S., Morningside
- BLUE, CAROL L., *Accountant, Contracts & Grants*, 1980, 1986. B.S., Auburn
- BOBO, FREDDY R., *Asst. Dir., Intr. Aud.*, 1981, 1985. B.S., Jacksonville State; M.P.A., AUM
- BODDIE, GERALDINE, *Clinical Supervisor (Comm. Disorders)*, 1983, 1984. B.S., Mercer; M.C.D., Auburn
- BOHANAN, DONNA J., *Assistant Professor (History)*, 1982. B.S., Hendrix; M.A., Ph.D., Emory
- BOHMANN, CHARLES F., *Manager, Drake S.H.C.*, 1973, 1985. B.S., New York
- BOLAND, JOSEPH S., III, *Associate Dean Engr. & Professor (Elec. Engr.)*, 1961, 1987. B.E.E., M.S., Auburn; Ph.D., Georgia Tech
- BOLAND, ROWENA H., *Mgr. Computer Lab, Learning Resources Center*, 1984, 1985. B.S., Huntingdon; M.S., Auburn
- BOLING, WILLIAM R., *Women's Tennis Coach, Athletic Department*, 1987, 1988. B.A., Murray State
- BOMAN, BRENDA, *Instructor (English)*, 1985. B.A., Auburn; M.A., Wright State
- BOND, EVELYN BRANCH, *Assistant Professor (Vac. & Adult Ed.)*, 1965, 1968. B.S., Berry; M.Ed., Auburn
- BOND, GORDON C., *Head Professor (History)*, 1967, 1985. B.S., M.A., Ph.D., FSU
- BONDS, STEPHANIE J., *Ext. Prog. Assoc., ADM-Education*, 1986, 1988. B.A., M.A., Auburn

- BOOSINGER, MARCIA L., *Librarian II, (Library)*, 1986. B.A., M.S., Purdue; M.L.S., Alabama
- BOOSINGER, TIMOTHY R., *Assistant Professor (Pathobiol.)*, 1983. D.V.M., Ph.D., Purdue
- BOUDREAU, MARY K., *Assistant Professor (Pathobiol.)*, 1986. D.V.M., LSU; Ph.D., Cornell
- BOUNDS, JIMMIE L., *Academic Adviser (Nursing)*, 1972, 1979. B.S., Montevallo; M.R.E., SW Baptist Theological Seminary
- BOWERS, FRANKLIN T., *Mgr., Anal. Inst. (Chemistry)*, 1977, 1979
- BOWERS, TIMOTHY L., *Resident Intern (S. An. & Surg.)*, 1986. D.V.M., Colorado State
- BOYD, ROBERT S., *Assistant Professor (Botany-Microbiology)*, 1988. B.S., M.S., California St.; Ph.D., California-Davis
- BOYHAN, GEORGE E., *Postdoctoral Fellow (Horticulture)*, 1989. M.S., Auburn
- BOYLES, WILEY R., *Professor (Management)*, 1970, 1984. B.S., Chattanooga; Ph.D., Tennessee
- BOZAK, MICHAEL J., *Assistant Professor (Physics)*, 1988. B.S., M.S., Michigan State; Ph.D., Oregon
- BRACKIN, H. GLENN, *Broadcast Media Op., Manager, Ed. TV*, 1960, 1968. B.S., Auburn
- BRACKIN, PATRICIA L., *Associate Director, Alumni Office*, 1956, 1985
- BRADBARD, MARILYN R., *Associate Professor & Head (Fam. and Child Dev.)*, 1978, 1984. B.S., New Hampshire; M.S., Ph.D., Georgia
- BRADEN, SUSAN R., *Assistant Professor (Art)*, 1987, 1988. B.S., Arizona; M.A., Northwestern; Ph.D., Florida State
- BRADLEY, BERT E., *Professor (Speech Comm.)*, 1973. A.B., Birmingham-Southern; M.A., Alabama; Ph.D., FSU
- BRADLEY, C. DIANE, *Librarian II, Library*, 1989. B.A., Alabama; M.S.L.S., Tennessee; M.A., Hardin-Simmons
- BRADLEY, JAMES T., *Associate Professor (Zoo-Wildlife Sc.)*, 1976. B.S., Wisconsin; Ph.D., Washington
- BRALY, DAVID K., *Visiting Assistant Professor (Architecture)*, 1987. B.Arch., Auburn
- BRAMLETT, GENE A., *Director, Center on Aging*, 1975, 1988. B.S., Murray State; M.S., Ph.D., Kentucky
- BRANCH, CHARLES E., *Associate Professor (Phys. & Pharma.)*, 1970, 1981. B.M.E., Ph.D., Auburn
- BRANDT, JAMES C., *Supervisor IV, Engineering Admin.*, 1987. B.A., South Florida; M.A., Auburn
- BRANDT, PAUL C. H., *Professor and Head (Build. Sci.)*, 1968. B.S., M.S., Illinois
- BRAUND, KYLE G., *Professor (Scott-Ritchey Res. Program)*, 1974, 1984. B.V.Sc., M.V.Sc., Ph.D., Sydney; F.R.C.V.S., London
- BRAWNER, WILLIAM R., JR., *Assistant Professor (Radiology)*, 1975, 1980. B.S., M.S., Florida; D.V.M., Ph.D., Auburn
- BREDDERMAN, PAUL J., *Librarian II (Library)*, 1987. B.S., M.S., Ph.D., Cornell; M.L.S., Tennessee
- BREWER, JESSE W., *Professor & Head (Entomology)*, 1987. B.S., M.A., Central Michigan; Ph.D., Purdue
- BREWER, WILLIAM G., *Assistant Professor (S. An. Sur. & Med.)*, 1987. B.S., D.V.M., Cal-Davis
- BRICKER, SANDRA A., *Instructor (Speech Comm.)*, 1987. M.A., Iowa
- BRIDGES, MICHAEL R., *Associate Director, Admissions*, 1982, 1988. B.S., M.P.A., AUM
- BRIGGS, WILLIAM S., *Assistant Professor (Arch.)*, 1986. B.S., M.Arch., Texas A&M
- BRITT, CHARLES R., *Assistant Professor (Fam. and Child Dev.)*, 1978. B.A., Birmingham-Southern; M.Div., Vanderbilt; M.A., Scarritt
- BROADUS, THOMAS W., *Assistant Professor (Sm. An. Surg. & Med.)*, 1988. B.S., M.S., D.V.M., Ph.D., California
- BROOKS, BELITA A., *Instructor (Foreign Language)*, 1988. B.A., Cornell; M.S., Middlebury
- BROOKS, ROBERT E., *Assistant Professor (Finance)*, 1986. B.S., FSU; Ph.D., Florida
- BROUGHTON, ROYALL M., JR., *Associate Professor (Textile Engr.)*, 1976. B.S., M.S., Ph.D., N. Carolina State
- BROWER, H. TERRI, *Professor (Nursing)*, 1985, 1988. B.S.N., M.A., Columbia; F.N.P., Miami-Fla.; Ed.D., Nova
- BROWN, ALFRED E., *Associate Professor (Bot. & Microb.)*, 1980, 1986. B.S., Long Beach State; Ph.D., UCLA
- BROWN, CAROLYN B., *Assistant Professor (English)*, 1967, 1981. B.A., M.A., LSU
- BROWN, CHARLES D., JR., *Associate Professor (Philosophy)*, 1967, 1978. B.A., M.A., LSU; Ph.D., Missouri
- BROWN, CLARENCE D., *Assistant Professor (Rehab. & Spec. Ed.)*, 1983, 1984. B.S., Troy St.; M.Ed., Auburn; Ph.D., Georgia
- BROWN, DAN A., *Assistant Professor (Civil Engr.)*, 1987. B.S.C., M.S.C.E., Ga. Tech; Ph.D., Texas
- BROWN, DAVID B., *Professor & Acting Head (Cmpt. Sc. & Engr.)*, 1972, 1980. B.S., Rutgers; M.S., Montana St.; Ph.D., Texas Tech
- BROWN, ELTON R., *Assistant Professor (Civil Engr.)*, 1987. B.S., M.S., Miss. State; Ph.D., Texas A&M
- BROWN, GREGORY H., *Instructor (Art)*, 1988. B.F.A., Auburn; M.F.A., Art Institute-Chicago
- BROWN, JACK B., *Professor (Math-FAT)*, 1967, 1976. B.A., M.A., Ph.D., Texas
- BROWN, JANICE E., *Admin. Assistant, ADM-Education*, 1973, 1986
- BROWN, JERRY E., *Humanities Professor, Ctr. for Arts and Humanities*, 1979, 1988. B.A., Auburn; M.A., Hollins; Ph.D., Vanderbilt
- BROWN, MARY H., *Assistant Professor (Speech Comm.)*, 1983. B.A., Centenary; M.A., Kentucky; Ph.D., Texas
- BROWN, PETER M., *Supt., Meats Lab. (An. & Dairy Sc.)*, 1981. B.S., M.S., Tennessee
- BROWN, R. TED, *Director of Purchasing*, 1987. B.B.A., M.P.A., Ga. State
- BROWN, SUE JANE, *Instructor (Math-FAT)*, 1978. B.A., M.A., Texas
- BRUCE, EDWIN J., *Electrical Engineer (Cmpt. Sci. & Engr.)*, 1981, 1985. B.E.E., Auburn
- BRYANT, AMANDA F., *Stu. Housing Spec., Housing*, 1979, 1982. B.A., AUM
- BUCCLEUGH, STEPHEN H., *Instructor (English)*, 1987. B.S., M.A., Alabama; Ph.D., Trento
- BUCHANAN, WILLIE RUTH, *Nutrition Spec., NFC on Aging (Nutr. & Foods)*, 1984, 1986. B.S., Jacksonville St.; M.S., USC
- BUCK, DONALD C., *Assistant Professor (Foreign Languages)*, 1984. B.A., M.A., Ph.D., Austin
- BUCKHALT, JOSEPH A., *Associate Professor (Coun. & Coun. Psych.)*, 1979, 1983. B.A., M.S., Auburn; Ph.D., Peabody
- BUDENSTEIN, JANE G., *Admin. Asst. (Liberal Arts)*, 1975, 1982. B.A., M.A., Auburn
- BULFIN, R. L., *Associate Professor (Ind. Engr.)*, 1980. B.I.E., M.S., Ph.D., Ga. Tech
- BURDG, HENRY B., *Director & Management Spec., A.T.A.C.*, 1978, 1985. B.A., M.B.A., Auburn
- BURGERING, DREW W., *Systems Analyst I (Univ. Printing Svc.)*, 1984, 1986. B.S., Auburn
- BURGESS, JOHN R., JR., *Coordinator, Union Programming*, 1978, 1980. B.S., M.Ed., Auburn
- BURKHALTER, BETTYE B., *Associate Professor (EFLT) & Special Assistant (VP-Research)*, 1978, 1985. B.S., M.A., Ed.D., Ph.D., Alabama
- BURKHALTER, JOHN E., *Associate Professor (Aerosp. Engr.)*, 1972, 1979. B.S., M.S., Auburn; Ph.D., Texas
- BURKHALTER, VERLYN M., *Director, Contracts & Grants Accounting*, 1962, 1985. B.S., Auburn

- BURKHART, BARRY R., *Director, Clin. Tra. Program & Professor (Psychology)*, 1974, 1978. B.S. M.S., Ph.D., FSU
- BURKHART, MARY Q., *Director, U. Cont. Ed.*, 1974, 1985. B.S., M.S., Ph.D., FSU
- BURLESON, DOUGLAS, *Visit, Assistant Professor (Architecture)*, 1986. B.S., Texas A&M; M.Arch., Rice
- BURLESON, REBECCA C., *Instructor (Building Science)*, 1988. B.S., Auburn
- BURLING, WILLIAM J., *Assistant Professor (English)*, 1985. B.S., M.A., Wisconsin-Eau Claire; Ph.D., Penn. State
- BURNELL, THOMAS W., *Assistant Professor (An. & Dairy Sciences)*, 1988. B.S., M.S., Ph.D., Nebraska
- BURNETT, JOHN RICHARD, *Associate Director, Univ. Computing*, 1985, 1986. B.S., N.E. Missouri State
- BURNEY, SAMUEL M., *Assistant to Director, Continuing Ed.*, 1986. B.S., West Point; M.S. Georgia Tech
- BURNS, CARL D., *Risk Manager, Business Svc.*, 1982.
- BURNS, MARK, *Assistant Professor (Political Science)*, 1975, 1976. B.A., Lambuth; A.M., Ph.D., Indiana
- BURNS, MOORE J., *Professor (Pharmaceutical Sciences)*, 1988, 1989. B.S., M.S., Auburn; Ph.D., Purdue
- BURROWS, BONNIE B., *Coord. of Testing, Student Dev. Svc.*, 1972, 1980. B.A., Samford; M.Ed., Auburn
- BURSON, SHIRLEY C., *Admin. Asst. (Engr. Adm.)*, 1971, 1984
- BUSCH, RUTH C., *Associate Professor (Soc. & Anthro.)*, 1970, 1978. A.B., Cornell; M.S., Utah State; Ph.D., Arizona
- BUSH, THERESA F., *Account. Specialist, Alumni*, 1983, 1987.
- BUSKIST, WILLIAM, *Assistant Professor (Psychology)*, 1981, 1982. B.S., Ph.D., Brigham Young
- BUSSELL, WILLIAM H., *Professor (Mech. Engr.)*, 1965. B.M.E., M.S.E., Florida; Ph.D., Michigan State
- BUTLER, ROGER A., *Assistant Professor (Math-FAT)*, 1985. B.A., Southampton; M.S., Ph.D., Warwick
- BUTTS, RACHEL, *Instructor (Accountancy)*, 1986. B.S., M.A., Auburn
- BUXTON, DONALD F., *Associate Professor (Anat. & Histol.)*, 1978. D.V.M., Auburn; Ph.D., Florida
- BYRD, E. KEITH, *Associate Professor & Coord. of Rehab. (Coun. & Coun. Psych.)*, 1976, B.A., Asbury; M.S., Va. Commonwealth; Ph.D., Wisconsin
- BYRD, ROBERT M., *Telecom. Tech. Specialist, Telecommunications & ETV*, 1987.
- CADENHEAD, A. KENNETH, *Professor (Curr. & Teach.)*, 1963, 1973. B.S., M.Ed., Georgia; Ed.D., Auburn
- CALL, ARTHUR, *Director, Food Services*, 1980, 1983
- CALLAWAY, NEAL, *Assistant Football Coach, Athletic Dept.*, 1981. B.S., Alabama
- CAMPAGNA, KEITH D., *Associate Professor and Head (Clinic. Pharmacy Practice)*, 1978. B.S., Pharm. D., Duquesne
- CAMPBELL, CATHYRN S., *Assistant Professor (Arch.)*, 1986. B.S., B.L.A., Auburn; M.L.A., Virginia
- CAMPBELL, LESLIE CAINE, *Associate Dean, Liberal Arts. & Professor (History & Journalism)*, 1968, 1972. B.S., Mississippi St.; M.A., Ph.D., Mississippi
- CAMPBELL, OLIVIA A., *Assistant Professor (Bot. & Microb.)*, 1970, 1974. A.B., Samford; M.S., Ph.D. Auburn
- CAMPBELL, WILLIAM H., *Dean & Professor (Pharmacy)*, 1988. B.S., M.S., Oregon State; Ph.D., Purdue
- CANEVA, THOMAS E., *Assistant Professor & Assistant Dir. of Bands (Music)*, 1985. B.S.M.E., Illinois; M.M., Texas
- CANNON, J. LEWIS, III, *Ext. Program Assoc., Center, Govt. Svc.*, 1971, 1976. B.S., S.F. Austin; M.A., Sam Houston
- CANTRELL, RICKY, *Acting Director (Chemistry)*, 1982, 1988. B.S., Auburn
- CARLISLE, W. HOMER, *Assistant Professor (Computer Science Engineering)*, 1988. B.A., M.S., Ph.D., Emory
- CARLSON, ROGER W., *Professor (Mech. Engr.)*, 1985. B.S., Penn. State; Ph.D., MIT
- CARRINGTON, THOMAS J., *Professor (Geology)*, 1967. B.S., M.S., Kentucky; Ph.D., Va. Tech
- CARROLL, PAMELA W., *Instructor (Curriculum & Teaching)*, 1987, 1988. B.A., Auburn; M.S., Florida State
- CARRUTH, CAROL, *Ext. Prog. Assoc. (Rehab. & Special Ed.)*, 1988. B.S., M.S.C., Auburn
- CARSON, ROBERT L., JR., *Assistant Professor (L. An. Surg. and Med.)*, 1978. D.V.M., Auburn; M.S., Georgia
- CARTEE, ROBERT E., *Associate Professor (Anat. & Histol.)*, 1973, 1983. B.A., Tennessee; B.S., D.V.M., Kansas State; M.S., Auburn
- CARTER, JUDITH H., *Instructor (Consumer Affairs)*, 1988. B.S., Auburn; M.S., M.S., Stephen F. Austin
- CASEY, TRAVIS G., *Assistant Football Coach, Athletic Dept.*, 1981. B.S., M.S., NE Oklahoma
- CASH, LEE W., *Professional Flight Coord., Auburn Aviation (Aerosp. Engr.)*, 1979. B.S., N. Carolina State; M.S., USC
- CAUDILL, STEVEN B., *Assistant Professor (Economics)*, 1981. B.A., Ohio Wesleyan; M.A., Ph.D., Florida
- CAUDLE, NANCY M., *Admin. Assistant, VP-Business & Finance*, 1976, 1987.
- CAULFIELD, DIEDRA J., *Art Designer (Pharmacy)*, 1985, 1988. B.S., SUNY
- CAUSEY, ANN S., *Instructor (Bot. & Microb.)*, 1979. B.S., M.S., Auburn
- CAUSEY, M. KEITH, *Professor (Zoo-Wildlife Sc.)*, 1968, 1980. B.S., M.S., Ph.D., LSU
- CAVENDER, DOROTHY H., *Assistant Dean (Human Sciences), Assistant Professor (Consumer Affairs)*, 1978, 1981. B.S., M.S., Kentucky Ed.D., Auburn
- CAYLOR, ARNOLD W., *Research Specialist (Horticulture)*, 1987. B.S., M.S., Auburn
- CHALOKWU, CHRISTOPHER L., *Assistant Professor (Geology)*, 1984. B.S., M.S., NE Illinois; Ph.D., Miami-Ohio
- CHAMBERS, ROBERT P., *Professor and Head (Chem. Engr.)*, 1976. B.S., M.S., Cal. Tech; Ph.D., California
- CHANG, KAI H., *Assistant Professor (Cmptr Sc. Engr.)*, 1986. Diploma, Taipei Tech; M.S., Ph.D., Cincinnati
- CHASTON, JOHN M., *Assistant Professor (Foreign Languages)*, 1987. B.A., M.A., Brigham Young; Ph.D., Texas
- CHAVEZ, IMAGENE H., *Account. Specialist, Telecommunications*, 1981, 1987.
- CHEN, AN-BAN, *Alumni Professor (Physics)*, 1974, 1986. B.S., Taiwan Normal; M.S., Ph.D., William & Mary
- CHERELLIA, GEORGE, *Assistant Professor (HHP)*, 1968, 1973. B.S., Houston; M.Ed., Rutgers
- CHILDERS, GARY T., *Director (Chemistry)*, 1983, 1985. B.S., M.Ed., Auburn
- CHILDRESS, GEORGE B., *Librarian II & Soc. Sc. Ref. Librarian (Library)*, 1981. B.A., Va. Commonwealth; M.A., M.L.S., Alabama
- CHIN, BRYAN A., *Professor (Mech. Engr. & Matls. Engr.)*, 1981, 1986. B.S., Auburn; M.S., Ph.D. Stanford
- CHO, SUWAN, *Postdoctoral Fellow (Physics)*, 1982, 1988. B.S., Seoul National M.S., Ph.D., Auburn
- CHRISTENSEN, ERIC R., *Assistant Professor (Mech. Engr.)*, 1986. B.S., Ph.D., Maryland; M.S., Cal. Tech
- CHRISTMAN, LISA A., *Assistant Professor (Cons. Alf.)*, 1987. B.S., E. Illinois; M.S., Illinois St.; Ph.D., Oklahoma State
- CIAMPI, JOSEPH R., *Head Women's Basketball Coach & Asst. Ath. Dir. Women's Ath.*, 1979, 1985. B.S., Mansfield State

- CICCI, DAVID A., Assistant Professor (Aerosp. Engr.), 1987. B.S., W. Va.; M.S., Carnegie-Melon; Ph.D., Texas
- CLARK, ALFRED J., Associate Professor (Nutrition and Foods), 1977. B.S., M.S., Ph.D., Iowa State
- CLARK, CARL H., Professor and Head (Phys. & Pharm.), 1953. B.S., D.V.M., Wash. State; M.S., Ph.D., Ohio State
- CLARK, JAMES A., Assistant Professor (English), 1982. B.A., M.A., N. Carolina; M.Phil., Ph.D., Yale
- CLARK, C. RANDALL, Alumni Professor (Pharm. Sci.), 1973, 1983. B.S., Berry; Ph.D., Mississippi
- CLARK-Lewis, SANDRA, Clin. Instructor (Comm. Dis.), 1974. B.S., M.S., Auburn
- CLEM, MARY C., Assistant Professor (Cons. Aff.), 1970, 1971. B.S., M.S., Auburn
- CLOTHIAUX, EUGENE J., Professor (Physics), 1970, 1984. B.S., SW Louisiana; M. Litt., Pittsburgh; Ph.D., New Mexico State
- CLOUD, ROBERT E., Telecom. Mgr., Telecom & ETV, 1987. B.E.E., Auburn
- CLOWDS, CHRISTI S., Assistant Director, Alumni Assn., 1985. B.S., Auburn
- COBB, HENRY C., IV, Electrical Engineer (Elec. Engr.), 1972. B.E.E., M.E.E., M.B.A., Auburn
- COCHRAN, JOHN E., JR., Professor (Aerosp. Engr.), 1967, 1985. B.S., M.S., Auburn; Ph.D., Texas; J.D., Jones Law
- CODY, REYNOLDS M., Associate Professor (Bot. & Microb.), 1961, 1965. B.S., Tennessee; M.S., Ph.D., Miss. State
- COKER, SAMUEL T., Professor (Pharm. Sci.), 1959, 1973. B.S., Auburn; M.S., Ph.D., Purdue
- COLBERT, JANET L., Assistant Professor (Accountancy), 1986. B.S., Illinois; M.B.A., Auburn; Ph.D., Georgia
- COMPTON, WILLIAM H., Director, Conference Center, 1984, 1988. B.A., Mississippi; M.S., George Washington
- COMSTOCK, ALLYSON G., Assistant Professor (Art), 1988. B.A., Occidental; M.F.A., Arizona State
- CONNALLY, JOSEPH H., Asst. Manager & Adm. Asst., Memorial Coliseum, 1952, 1979. B.S., Georgia
- CONNELL, BARBARA C., Assistant to VP (Vice President for Research), 1979, 1985
- CONNER, DIXIE F., Business Mgr., Athletic Dept., 1974, 1981. B.S., Auburn
- CONNER, PAUL C., Mgr. Facilities, Athletic Dept., 1964, 1987. B.S., M.S., Auburn
- CONRAD, HAROLD N. Jr., Associate Dir., Engr. Student Svc., 1978, 1984. B.S., W. Fla.; M.Ed., Ed.D., Auburn
- COOK, JAMES P., Instructor (Accounting), 1988. B.S., M.Ac., Auburn
- COOK, KEVIN L., Librarian II (Library), 1985. B.A., M.L.S., Oklahoma
- COOK, PATRICIA L., Instructor (Building Science), 1988. B.A., B.S., Auburn
- COOK, ROBERT B., JR., Professor & Head (Geology), 1972, 1984. E.M., Colorado Mines; M.S., Ph.D., Georgia
- COOLEY, BOBBY R., Producer-Director III (Ed. TV), 1976, 1977. B.A., M.S.C., Auburn
- COOPER, HAROLD C., Assistant Track Coach, Athletic Dept., 1983. B.S., Auburn
- COOPER, JOHN R., Associate Professor (Physics), 1969, 1982. B.E.P., Ph.D., Auburn; M.S., Ohio State
- COOPER, MARGARET A., Assistant Professor (Rehab. & Spec. Ed.), 1985, 1986. B.A., Antioch; M.S., Peabody; Ph.D., Kent State
- COOPER, NADINE H., Coordinator (HHP), 1967, 1986
- COOPER, THOMAS E., Assistant Professor (Build. Sc.), 1984. B.S., M.S., Auburn
- COPPINGER, PAMELA D., Account. Assistant Mgr., Bursar, 1987, 1988. B.S., S. Carolina
- COPPINGER, TYRUS R., Alumni Director for Develop., 1985, 1987. B.S., Auburn
- CORSBY, CAROLE A., Adjunct Instructor (Bot. & Microb.), 1976. B.S., M.A.C.T., Auburn
- COSGROVE, SHEREE H., Ext. Prog. Assoc. (Rehab. & Special Ed.), 1988. B.Ed., Florida; M.S.C., Auburn
- COSGROVE, STEPHEN E., Coordinator (Rehab. & Special Ed.), 1988. B.A., M.S., Sou. Illinois; Ed.D., Auburn
- COTTIER, JOHN W., Assistant Professor (Soc.-Anthro.), 1976, 1982. B.A., Auburn; M.A., Alabama; Ph.D., Missouri
- COUCH, ROBERT, Associate Professor (Rehab. & Spec. Ed.), 1967, 1977. A.B., M.A., Montevallo; Ed.D., Auburn
- COUNTERMINE, TERRY, Visiting Assistant Professor (Management), 1988. M.S., Alliance; D.Ed., Penn State
- COVINGTON, PEGGY D., Instructor (Marketing & Transportation), 1987, 1988. B.S., M.B.A., Auburn
- COX, DWAYNE D., Archivist, U. Archives, 1986. B.A., Kentucky Wesleyan; M.A., Louisville; Ph.D., Kentucky
- COX, J. GRADY, Professor (Ind. Engr.), 1958, 1963. B.S., M.S., Auburn; Ph.D., Purdue
- COX, NANCY R., Assistant Professor (Scott-Ritchey Research), 1985. B.S., D.V.M., Texas A&M; M.S., Auburn
- COX, SHIRLEY O., Director of Language Lab. and Instructor (Foreign Languages), 1969. B.A., L. Island; M.Ed., Florida
- COX, W. FRANK, Football Equipment Mgr., Athletic Dept., 1977. B.S., M.S., Auburn
- CRABTREE, ROBERT D., Assistant Professor (HHP), 1987. B.S., Oregon State; Ph.D., Texas A&M
- CRAIG-SCHMIDT, MARGARET C., Assistant Professor (Nutrition & Foods), 1977. B.A., Duke; Ph.D., Wisconsin
- CRANDELL, GEORGE W., Instructor (English), 1988. B.A., N. Carolina; M.A., Ph.D., Texas
- CRAWFORD, CHARLES J., Supt. of Grounds, Grounds Crew, 1975, 1986. B.A., B.S., M.Ag., Auburn
- CRENSHAW, CURTIS L., JR., Financial Aid Counselor, Student Financial Aid, 1978. B.S., M.Ed., Tuskegee
- CREWS, RICHELLE W., Adjunct Instructor (Rehab. & Special Ed.), 1987. B.S., M.C.D., Auburn
- CREWS, WALTER B., Assistant Professor (Rehab. & Spec. Ed.), 1985, 1986. B.S., M.S., FSU; Ph.D., Florida
- CRISS, ROBERT R., Associate Professor (Accountancy), 1966, 1970. B.B.S., M.B.A., LL.D., J.D., Mississippi
- CROCKER, MALCOLM J., Professor & Head (Mech. Engr.), 1983. B.S., M.S.E., Southampton; Ph.D., Liverpool (England)
- CROCKER, RUTH C., Assistant Professor (History), 1983. B.A., Oxford; M.A., Ph.D., Purdue
- CROFTON, JUDY B., Instructor (English), 1988. B.A., M.A., Auburn
- CRONENBERG, ALLEN T., Associate Professor (History), 1968, 1976. A.B., M.A., N. Carolina; Ph.D., Stanford
- CROSS, JAMES H., Assistant Professor (Cmpt. Sc. Engr.), 1986. B.S., Houston; M.S., Sam Houston; Ph.D., Texas A&M
- CROSS, STEPHEN A., Research Associate (Civil Engr.), 1988. B.S.C.E., M.S.C.E., Arkansas
- CROUCH, PAUL W., Director, Student Dev. Svc., 1969, 1986. B.A., Presbyterian; M.Div., Columbia Seminary; M.Ed., Ed.D., Auburn
- CROWDER, MARGARET A., Assistant Editor, Rdo. & TV., University Relations, 1987. A.B.J., Georgia
- CROWELL, STEVEN J., Assistant Professor (Accountancy), 1987. B.S., N. Carolina; M.A., Ph.D., Georgia
- CUMBE, JACK A., Instructor (Philosophy), 1978, 1986. B.S., Auburn; Ph.D., Wisconsin
- CUNNINGHAM, CLARA A., Instructor (English), 1987. B.A., Texas-El Paso; M.A., Texas
- CUNNINGHAM, GARY R., Instructor (Chemistry), 1988. B.A., Tennessee; M.S., Middle Tennessee State
- CURRY, MARY J., Instructor (English), 1987. B.A., Birmingham-Southern; M.A., Alabama; M.A., Alabama-Birmingham

- CURTIS, CHRISTINE W., Assistant Professor (Chemical Engr.), 1976, 1985. B.S., M.S., Mercer; Ph.D., FSU
- CUTCHINS, MALCOLM A., Professor (Aerospace Engr.), 1966, 1979. B.S., M.S., Ph.D., Va. Tech
- DANIEL, JAMES E., Assistant Football Coach, Athletic Dept., 1981. B.S., Alabama State
- DANIELS, MARGARET M., Assistant Professor (Math-FAT), 1985. B.S., Maharishi Internatl., M.S., Ph.D., Auburn
- DANIELS, SELDON A., Assistant Professor (HHP), 1972. B.S., Lincoln Memorial; M.S., Kearney State; Ph.D., New Mexico
- DARCH, CRAIG B., Assistant Professor (Rehab. & Spec. Ed.), 1982. B.S., M.S., Wisconsin; Ph.D., Oregon
- DARDEN, MARSHA L., Union Program Director, Student Activities, 1980, 1982. B.S., M.Ed., Auburn
- DARLING, CHARLES M., Professor & Associate Dean (Pharmacy), 1969, 1984. B.S., Ph.D., Mississippi
- DARLING, RIEKO M., Assistant Professor (Communication Disorders), 1988. B.S., M.S., Ph.D., Florida State
- DARON, CAROL F., Adjunct Asst. Prof. (English), 1974, 1981. B.A., Huntingdon; M.A., FSU; Ph.D., Auburn
- DARON, HARLOW H., Professor (An. & Dairy Sc.), 1967, 1982. B.S., Oklahoma; Ph.D., Illinois
- DAUGHTERY, TERRELL W., Assoc. Director, Univ. Cmptng., 1979, 1982. M.S., Auburn; M.S., West Coast
- DAVENPORT, JOANNA, Visiting Professor (HHP), 1987, 1988. B.S., Skidmore; M.S., Smith; Ph.D., Ohio State
- DAVID, FRED R., Associate Professor (Management), 1986. B.S., M.B.A., Wake Forest; Ph.D., S. Carolina
- DAVIDSON, JIMMY L., Associate Professor (Elec. Engr.), 1984. B.A., Hendrix, B.S., Ph.D., Columbia
- DAVIDSON, WILLIAM M., JR., Asst. Athletic Director, Athletic Dept., 1964. B.S., Auburn
- DAVIES, WILLIAM D., Professor (Fish. & Allied Aqua.), 1970, 1983. B.S., Purdue; M.S., Ohio State; Ph.D., N. C. State
- DAVIS, A. JACKSON, Construction Engineer, Technical Services, 1987. B.A., Auburn
- DAVIS, C. GRANT, JR., Assistant Dean of Students, 1978, 1980. B.S., M.Ed., Auburn
- DAVIS, DONALD E., Project Coordinator, VP-Research, 1947, 1986. B.Ed., Ped.D., E. Illinois; M.S., Ph.D., Ohio State
- DAVIS, KERMIT R., JR., Associate Professor (Management), 1979, 1985. B.S., M.B.A., Miss. State; Ph.D., Georgia
- DAVIS, NICHOLAS D., Alumni Professor (Architecture), 1963, 1973. B.A., B.S., Arch., Rice; M.F.A., Princeton
- DAVIS, TERRY C., Assistant Professor (Forestry), 1965. B.S., M.S., Va. Tech.; Ph.D., W. Virginia
- DAVIS, WILLIAM H., Professor (Philosophy), 1966, 1980. B.A., M.A., Abilene Christian; Ph.D., Rice
- DAWSEY, CYRUS B., III, Associate Professor (Geography), 1975, 1982. B.S., M.A., FSU; Ph.D., Florida
- DAWSEY, JAMES M., Associate Professor (Religion), 1978, 1983. B.S., Florida Southern; M.Div., Ph.D., Emory
- DAY, WILLIAM B., Associate Professor (Cmpt. Sc. & Engr.), 1971, 1984. B.E.E., Auburn; M.S., Ph.D., Rensselaer
- DAYVAULT, JULIE K., Info Ctr. Specialist, Admin. Cmpt. Svc., 1973, 1985. B.A., M.A., M.I.D., Auburn
- DEAN, BOBBY S., Auditor I, Internal Auditing, 1986. B.S., Auburn
- DEATON, WILLIAM L., Associate Professor (EFLT), & Act. Assoc. Dean (Education), 1977, 1985. B.S., Albany State. M.S.Ed., Ph.D., Kansas
- DEBRUNNER, L. E., Assistant Professor (Forestry), 1961. B.S., Cincinnati; M.F., Yale; D.F., Duke
- DECKER, CRAIG A., Assistant Professor (Political Science), 1988. B.S., Virginia; M.S.E., Johns Hopkins; Ph.D., MIT
- DEEN, MARVIN E., Resident Mgr., Sewell Hall, 1980. B.S., B.S., Auburn
- DEGROOT, WILHELMUS M., Manager of Prod. Control, Op. Suppt., 1982, 1983. B.A., Troy State
- DELLINGER, LAFAYE E., Associate Mgr., Food Svc., 1982
- DEMAINE, MARGARET M., Research Fellow (Chemistry), 1988. B.A., M.S., British Columbia; Ph.D., Cambridge
- DEMAINE, PAUL A.D., Professor (Cmpt. Sc. Engr.), 1982. B.S., Witwatersrand-S. Africa; Ph.D., British Columbia
- DENEKE, CHARLES F., Assistant Professor (Horticulture), 1989. Ph.D., Penn State
- DENNIS, STEPHEN, Assistant Football Coach, Athletic Dept., 1985. B.S., Georgia
- DENNY, ELANE, Assistant Professor (Theatre), 1987. B.A., W. Maryland; M.F.A., Indiana
- DERUITER, JACK, Assistant Professor (Pharm. Sc.), 1983. B.A., Hope; M.S., Michigan; Ph.D., Va. Commonwealth
- DE SOUZA, GERALDO SOARES, Associate Professor (Math-FAT), 1982, 1985. B.S., Pernambuco-Brazil; M.S., Rochester. Ph.D., SUNY
- DEYTON, DIANA E., Flight Instructor I, AU Aviation, 1984. B.A., Auburn
- DIAMOND, DOUGLAS K., Sanitarian, Drake S.H.C., 1975. B.S., Auburn
- DICKSON, THOMAS L., Professor (Pol. Sci.), 1968, 1976. B.A., M.A., Ph.D., Texas
- DIEBOLD, MARTIN H., Associate Professor & Acting Head (Rehab. & Spec. Ed.), 1975, 1982. M.A., S. Florida; Ed.D., Georgia
- DILLARD, CAROL E., Staff Dietitian & Adjunct Instructor (Nutrition & Foods), 1976. B.S., Jacksonville State
- DILLARD, ROBERT B., Women's Gymnastics Coach, Athletic Dept., 1985. B.S., Samford; M.S., Jacksonville State
- DILLON, ALLEN R., Professor (S. An. Surg. & Med. & Scott-Ritchey Research), 1973, 1986. B.S., D.V.M., Texas A&M; M.S., Auburn
- DINIUS, ROBERT H., Associate Professor (Chemistry), 1961, 1965. B.S., Illinois Wesleyan; M.S., Missouri; Ph.D., FSU
- DINIUS, SARA H., Associate Professor (Accountancy), 1968, 1980. B.S., Northwestern; M.S., Ph.D., Auburn
- DIORIO, DOROTHY M., Castanoli Professor (Foreign Languages), 1972, 1977. B.A., Bucknell; M.A., Middlebury; Ph.D., N. Carolina
- DIXON, CARL F., Associate Professor (Zoo.-Wildlife Sc.), 1964, 1970. B.A., Colorado; Ph.D., Kansas State
- DIXON, ROBERT K., Associate Professor (Forestry), 1986. B.S., M.S., Ph.D., Missouri
- DOBIE, JAMES L., Professor (Zoo.-Entomol.), 1967, 1980. B.S., Centenary; M.S., Ph.D., Tulane
- DOBSON, F. STEPHEN, Assistant Professor (Zoology-Wildlife Science), 1988. M.A., California; Ph.D., Michigan
- DOERSTLING, STEFFEN R., Professor (Architecture), 1966, 1973. B.A., Institute of Tech., Munich, Germany; M.A., Dr. of Engineering, Institute of Tech., Stuttgart, Germany
- DONNAN, HUGH H., Professor (Couns. & Counsel. Psych.), 1965, 1975. B.A., M.Ed., Furman; Ph.D., N. Carolina
- DONNELLY, ROBERT A., Associate Professor (Chemistry), 1979. B.S., M.S., L.S.U.; Ph.D., N. Carolina
- DOORENBOS, NORMAN J., Associate Vice President/Dean & Professor (Graduate School), 1986. B.S., M.S., Ph.D., Michigan
- DORGAN, WILLIAM J., Coordinator (Sciences & Mathematics), 1988. B.S., St. Ambrose; M.S., Creighton; Ph.D., Colorado Med. Center
- DOWNER, SHERIDA H., Librarian III & Head, Circulation (Library), 1978, 1984. B.A., George Williams; M.A.I.S., Rosary

- DOYLE, PETER R., *Instructor (Religion)*, 1988. B.A., Washington & Lee; M.Div., Seabury-Western; D.D., Episcopal Th.D., Trinity
- DOZIER, WILLIAM A., JR., *Professor (Horticulture)*, 1971, 1984. B.S., M.S., Auburn; Ph.D., Va. Tech
- DRAGOIN, ANTHONY, *Associate Professor (HHP)*, 1951, 1974. B.S., M.S., Auburn; Ed.D., Alabama
- DRAKE, DENNIS C., *Counselor, Student Dev. Svc.*, 1974. B.A., M.Ed., Ed.S., Auburn
- DRAKE, JAMES BOB, *Associate Professor (Voc. & Adult Ed.)*, 1973, 1983. B.S., M.Ed., Ed.D., Auburn
- DRAKE, KYLE S., *Director, Phys. Plant*, 1983, 1985. B.S., Alabama
- DRAKE, NELL R., *Sys. Analyst II, Admin. Cmptr. Svc.*, 1980, 1982. B.A., M.S., M.Ed., Auburn
- DRIGGERS, STEPHEN G., *Assistant Professor (English)*, 1982. B.A., Texas; Ph.D., Indiana
- DRINKARD, CINDY T., *Accountant, Budget Control*, 1987. B.S., UAB
- DRYDEN, DAVID B., *Assistant Professor (EFLT)*, 1988. B.S., Brigham Young; J.D., George Washington
- DUBBERLY, KERI L., *Admin. Assistant, VP-Research*, 1987. B.S., Auburn
- DUDCHOCK, NATALIE R., *Instructor (Speech Comm.)*, 1988. M.S.C., Auburn
- DUFFIELD, FRANCES J., *Assistant Professor (Cons. Aff.)*, 1976. B.S., Montana State; M.S., Va. Tech; Ph.D., Tennessee
- DUFFIELD, SHEILA R., *Accountant, Assistant Treasurer*, 1987. B.S., Alabama
- DUGAS, RAY B., JR., *Associate Professor (Art)*, 1974, 1980. B.F.A., LSU; M.V.A., Georgia State
- DUNCAN, CAROL L., *Admin. Assistant, Intercollegiate Athletics*, 1988. B.S., Auburn; M.S., South Alabama
- DUNCAN, DEBORAH S., *Assistant Director II, Alumni*, 1987. B.S., Auburn
- DUNCAN, STEPHEN F., *Specialist (Family & Child Development)*, 1988. B.S., Utah; M.S., Brigham Young; Ph.D., Purdue
- DUNLOP, ALEXANDER W., *Assistant Professor (English)*, 1972, 1976. B.A., Hobart; M.A., Ph.D., N. Carolina
- DUNN, RUSSELL F., *Instructor (Chemical Engineering)*, 1988. B.S., M.Ch.E., Auburn
- DUNNING, ROBERT L., *Research Fellow (Civil Engineering)*, 1988. B.S., Lewis & Clark; M.S., Oregon State
- DURAN, SUE H., *Assistant Professor (L. An. Surg.)*, 1975, 1978. B.S., M.S., Auburn
- DURBIN, KIM M., *Assistant Director, Co-op. Ed.*, 1981, 1985. B.S., M.Ed., Auburn
- DUSI, JULIAN L., *Professor (Zoo.-Wildlife Sc.)*, 1949, 1963. B.S., M.S., Ph.D., Ohio State
- DYE, PATRICK F., *Athletic Director & Head Football Coach, Athletic Dept.*, 1981. B.S., Georgia
- DYER, DAVID F., *Professor (Mech. Engr.)*, 1965, 1976. B.S.M.E., Tennessee; M.S.M.E., Ph.D., Georgia Tech
- DYER, FREDERICK N., *Professor (Psychology)*, 1988. B.S., Eastern Michigan; M.A., Ph.D., Michigan State
- EASTERDAY, KENNETH E., *Professor (Curr. & Teach.)*, 1964, 1972. B.S., M.A.T., Indiana; Ed.D., Western Reserve
- EASTERWOOD, ROY M., *Research Assoc., Center for Govt. Svc.*, 1985. B.A., Auburn; M.P.A., M.A., Alabama-B'ham
- EAVES, RONALD C., *Professor (Rehab. & Spec. Ed.)*, 1977, 1983. B.A., M.Ed., Florida, Ph.D., Georgia
- ECKMAN, SHEILA R., *Assistant Director, Alumni Office*, 1978, 1986. B.S., Auburn
- EDMISTON, FRED W., *Librarian II, Library*, 1986. B.S., Spring Hill; M.A., Mississippi; M.L.S., Sou. Mississippi
- EDMONDS, CHARLES, III, *Professor (Finance)*, 1973, 1985. B.A., M.S.A., Auburn; Ph.D., Arkansas
- EDWARDS, CONNIE R., *Research Assoc. (Mkt. & Transp.)*, 1986. B.S., M.B.A., Auburn
- EDWARDS, OLLIE H., *Asst. Supvr., Flight Instrn., Auburn Aviation*, 1978, 1982. B.S., M.S., Auburn
- EKELUND, ROBERT B., JR., *Lowder Professor (Economics)*, 1977, 1979. B.B.A., M.A., St. Mary's; Ph.D., LSU
- ELFSTROM, GERARD A., *Assistant Professor (Philosophy)*, 1988. B.A., Cornell; M.A., Ph.D., Ph.D., Emory
- ELLINGTON, JERROLYN L., *Asst. Mgr., Chemistry Sc. Supp. Store*, 1970, 1981
- ELLIOTT, MAXINE L., *Librarian II (Library)*, 1985. B.S., M.L.S., Illinois
- ELLIS, CHARLES D., *Mgr., Microelec. Lab.*, 1986. B.S., Auburn
- ELLIS, LESLIE P., *Instructor (Accountancy)*, 1988. B.S., M.Ac., Auburn
- ELLIS, MARY A., *Instructor (English)*, 1987. B.A., Birmingham-Southern; M.F.A., Alabama
- ELLIS, PATRICIA R., *Nursing Director, Drake S.H.C.*, 1981. B.S., Ed.D., Alabama; M.S., S. Francisco State
- EL-MOGAHZY, YEHIA E., *Assistant Professor (Textile Engr.)*, 1986. B.S., M.S., Alexandria-Egypt; Ph.D., N.C. State
- ELMORE, KATE D., *Instructor (Foreign Languages)*, 1974. B.A., Agnes Scott; M.A., Radcliffe; M.A. Oxford
- ELTON, DAVID J., *Assistant Professor (Civil Engr.)*, 1985. B.S., Clarkson; M.S., Utah State; Ph.D., Purdue
- EMERT, GEORGE H., *Executive Vice President, President's Ofc.*, 1984. B.A., Colorado; M.A., Colorado State; Ph.D., Va. Tech
- ENSMINGER, STEPHEN S., *Coordinator, I.D. Cards*, 1987. B.S., Auburn
- EOM, HYUN BOK, *Assistant Professor (Management)*, 1985. B.A., Korea U.; M.B.A., Seoul National Korea; M.S., S. Carolina; Ph.D., Nebraska
- ESCARPANTER, JOSE A., *Associate Professor (Foreign Languages)*, 1982, 1985. Ph.D., Havana
- ESER, SEMIH, *Research Associate (Chem. Engr.)*, 1987. B.S., M.S., Mid. E. Tech.; Ph.D., Penn. State
- ESMELOGLU, SADIK, *Assistant Professor (Elec. Engr.)*, 1986. B.S. Bogazici-Istanbul; M.S., Ph.D., S. Carolina
- EVANS, PATRICIA J., *Instructor (Accountancy)*, 1972. B.S., M.S., Auburn
- EVERETT, GERALD W., *Acting Director & Staff Physician, S.H.C.*, 1982. A.B., George Washington; M.D., Alabama
- FABEL, ROBIN F. A., *Associate Professor (History)*, 1969, 1980. B.A., M.A., Oxford; Ph.D., Auburn
- FAIR, KATHY L., *Librarian II (Library)*, 1985. B.A., Harding; M.L.S., Alabama
- FARRINGER, JOHN A., *Assistant Professor (Clinical Pharmacy)*, 1985. B.S., Texas Tech; B.S., Pharm.D., Texas
- FARRINGTON, JOSEPH C., *Assistant Professor (Couns. & Couns. Psych.)*, 1988. B.A., Auburn; M.S., Georgia Col.; Ed.D., Auburn
- FAUPEL, CHARLES E., *Assistant Professor (Sociology)*, 1983. B.A., Asbury; M.A., Cen. Mich.; Ph.D., Delaware
- FAUST, JEFFREY B., *Instructor (Foreign Language)*, 1988. B.A., M.H.S., Auburn
- FAUST, RANDALL E., *Assistant Professor (Music)*, 1982. B.S., E. Mich.; M.Mus., Mankato; D.M.A., Iowa
- FAUST, ROBERT L., *Professor (Architecture)*, 1968, 1982. B.A., Arch. Oklahoma
- FAWVER, AMY L., *Resident (Physiology & Pharmacology)*, 1988. B.S., D.V.M., Oregon State
- FEASTER, WILLIAM M., *Associate Professor (Elec. Engr.)*, 1956, 1965. B.S.E.E., M.S.E.E., Auburn
- FEILD, HUBERT S., *Lowder Professor (Manage. & Psychology)*, 1973. B.S., M.S., Miss. State; Ph.D., Georgia
- FELKEY, BILL G., *Director & Instructor (Pharmacy)*, 1977. B.A., Maine; M.S., Indiana

- FELLERS, ROBIN B., Assistant Professor (Nutrition & Foods), 1988. Diplom. Otago; M.S., Kansas State; Ph.D., Florida
- FELLOWS, HUGH L., Research Associate (Chem. Engr.), 1984. B.S., M.S., Auburn
- FELLOWS, PAUL D., Manager-Operations (Chemical Engineering), 1987. B.A., JSU
- FENDLEY, BETTY J., Academic Adviser (Architecture), 1972, 1981. B.A., Tusculum; M.Ed., Auburn
- FENG, QI, Visiting Assistant Professor (Math-FAT), 1988. B.S., Harbin Inst. Tech.; M.A., Ph.D., Penn State
- FENNER, JAMES H., Assistant Professor (Aerosp. Engr.), 1987. B.S., Washington; Diploma, Imperial-England; Ph.D., London
- FERNANDEZ, CONRADO E., Staff Physician, Drake S.H.C., 1983. M.D., Santo Tomas-Manila
- FIDEL, JANEAN L., Intern (Sm. An. Surg. & Med.), 1988. B.S., M.S., D.V.M., California
- FIELDS, KENT T., Associate Professor (Accountancy), 1984. B.B.A., N. Texas; M.P.A., Texas; Ph.D., Texas A&M
- FINN, J. SCOTT, Visiting Assistant Professor (Architecture), 1987. A.B., Princeton; M.Arch., Yale
- FISCHER, SCOTT E., Visit. Instr. (Architecture), 1983, 1984. B.Arch., B.S., Auburn
- FITCH-HAUSER, MARGARET E., Associate Professor (Speech Comm.), B.A., M.A., Stephen F. Austin; Ph.D., Oklahoma
- FITZPATRICK, BEN, JR., Professor (Math-FAT), 1959, 1977. B.S., Auburn; M.A., Ph.D., Texas
- FITZPATRICK, MARJORIE H., Assistant Professor (Math-FAT), 1979. B.S., Jacksonville State; M.S., Ph.D., Auburn
- FLEMING, BARRY, Assistant Professor (Art), 1988. B.F.A., Western Kentucky; M.F.A., Tennessee
- FLETCHER, ELIZABETH T., Instructor (English), 1988. B.S., M.S., Auburn
- FLETCHER, JOHN T., Associate Registrar, Registrar, 1988. B.S., M.S., Tennessee
- FLICK, WILLIAM C., Acad. Cmping. Spec. III, Univ. Computing, 1983, 1985. B.A., Kentucky; M.A., Ph.D., Sou. Illinois
- FLOOD, CLIFFORD A., JR., Associate Professor (Ag. Engr.), 1971, 1979. B.A.E., Florida; M.S., Kentucky; Ph.D., Purdue
- FLOWERS, J. DON, Director, Ctr. for Mat. & Exec. Development (Business), 1981. B.B.A., Georgia; M.B.A., Auburn
- FLYNN, ROBERT E., Undergrad. Counselor (Elec. Engr.), 1984. B.S., Fordham; M.P.S., M.Ed., Auburn
- FLYNT, WAYNE, Hollifield Professor (History), 1977, 1983. A.B., Samford; M.S., Ph.D., FSU
- FOBER, MARILYN R., Research Associate (Rehab. & Special Ed.), 1987, 1988. B.S., Wisconsin; M.S., Tennessee
- FOLKERTS, DEBBIE R., Instructor (Bot.-Microbiol.), 1986. B.S., M.S., Auburn
- FOLKERTS, GEORGE W., Professor (Zoo.-Wildlife Sc.), 1966, 1977. B.A., M.A., S. Illinois; Ph.D., Auburn
- FORD, DORIS E., Assistant Professor (Pol. Sci.), 1968, 1974. B.S., Howard; M.S., Ph.D., G. Washington
- FORD, F. NELSON, Assistant Professor (Management), 1982. B.S., M.A., Ph.D., Alabama
- FORD, HAYDEN THOMAS, JR., Assoc. Professor (HHP), 1969, 1978. B.S., M.S., Jacksonville State; Ed.D., Georgia
- FORD, RALPH M., Associate Professor (Math-FAT), 1965, 1967. B.E.P., M.S., Ph.D., Auburn
- FOSTER, WINFRED A., JR., Associate Professor (Aerosp. Engr.), 1969, 1983. B.A.E., M.S., Ph.D., Auburn
- FOWLER, NED W., Assistant Basketball Coach, Athletic Dept., 1987. B.S., M.Ed., E. Texas
- FREEMAN, GEORGE D., Associate Director, Alumni, 1988. B.A., Harding
- FREEMAN, JOHN D., Assoc. Professor (Bot. & Microb.), 1968, 1973. B.A., Austin Peay; Ph.D., Vanderbilt
- FRENCH, FRANCES C., Associate Professor (Soc. & Anthro.), 1960, 1982. B.A., M.S., LSU; J.D., Jones Law
- FRIEDMAN, DENNIS, Academic Adviser (Art), 1987. B.S., Elmira; M.F.A., Ohio
- FRIEDMAN, HARRIET, Adviser (Business), 1969, 1981. B.A., Hunter; M.A., Yale
- FRIEDMAN, MICHAEL E., Professor (Chem.), 1968, 1983. B.S., Penn; M.S., Brooklyn Tech; Ph.D., Cornell
- FROBISH, LOWELL T., Director & Professor, Admin. Agric. Exp. Sta., 1986. B.S., Ph.D., Iowa State
- FROMHOLD, A. T., JR., Professor (Physics), 1965, 1969. B.S., M.S., Auburn; Ph.D., Cornell
- FRY, RUTH, Instructor (English), 1985. B.A., M.A., S. Fla.; Ph.D., Ga. State
- FUKAI, JUNICHIRO, Associate Professor (Physics), 1974. B.S., Waseda; M.S., Denver; Ph.D., Tennessee
- FUKAI, S.N., Mgt. Spec., Ctr. for International Commerce, 1986. LL.M., Tokyo; M.A., Denver; Ph.D., Tennessee
- FURR, JAMES E., Associate Professor (Art), 1977. B.F.A., Tennessee; M.F.A., Tulane
- GLAGIANO, CARL S., Electrical Engineer, Facilities, 1987. B.E.E., Auburn
- GANDY, REX F., Assistant Professor (Physics), 1984. B.S., M.S., Memphis State; Ph.D., Texas
- GANGOPADHYAY, ANIRUDDHA, Research Associate (Path. & Parasit.), 1986. B.S., Calcutta; M.S., Ph.D., NBU-India
- GARDINER, LORRAINE R., Instructor (Management), 1988. B.A., Hollins
- GARDINER, STANLEY C., Assistant Professor (Management), 1987, 1988. B.A., USC; M.A., Pepperdine; Ph.D., Georgia
- GARREN, LOIS Z., Associate Professor & Head (Theatre), 1980, 1983. B.A., E. Carolina; M.A., M.F.A., Virginia
- GARRETT, JAMES R., Instructor (English), 1986, 1988. B.S., Alabama; B.S., M.A., Montevallo; Ph.D., Auburn
- GARRETT, PHILLIP D., Assistant Professor (Anat. & Hist.), 1977. B.S., M.S., D.V.M., Missouri
- GARRISON, KAREN H., Assistant Professor (Music), 1983, 1986. B.A., N. Carolina; M.M., S. Carolina; D.M., FSU
- GARRISON, ROGER W., Assistant Professor (Economics), 1978. B.S., Missouri-Rolla; M.A., Missouri-KC, Ph.D., Virginia
- GARZA, JUANITA, Health Nurse, Drake S.H.C., 1980. B.S., Nebraska; M.S., Troy State
- GASTALDO, ROBERT A., Associate Professor (Geology), 1978, 1983. B.A., Gettysburg; M.S., Ph.D., S. Illinois
- GASTON, PATRICIA S., Instructor (English), 1987. B.A., W. Michigan; Ph.D., Florida
- GAU, CHRISTOPHER C., Intern (Sm. An. Surg. & Med.), 1988. D.V.M., Nat'l Veterinary (France)
- GAY, MARIAN J., Manager, Temporary Office Services, 1971, 1981
- GEHLING, ROBERT G., Director, Financial Information System, 1981. B.S., Austin Peay; M.B.A., N. Florida
- GEIGER, DOROTHY, Lab. Supr. & Adj. Instr. (Bot. & Microb.), 1973, 1984. B.S., M.S., Auburn
- GEIGER, GRADY EUGENE, Librarian III and Head, Spec. Coll. (Library), 1960, 1980. B.S., Auburn; A.M.L.S., Michigan
- GEIGER, SIDNEY E., Director, Property Control, 1967, 1982. B.S., Auburn
- GERBER, LARRY G., Associate Professor (History), 1983. B.A., M.A., Ph.D., Cal.-Berkeley
- GERSCHEFSKI, MARTHA, Assistant Professor (Music), 1988. Diploma, Juilliard; Diploma, Chigiana
- GHAUSTIN, PATRICK J., Volleyball Coach, Athletic Department, 1985. B.A., Georgia
- GIBBS, NANCY J., Librarian II (Library), 1982. B.S., Madison; M.S., Denver
- GIBBS, ROBERT C., Assistant Librarian, Ref. & Info. Svc. (Library), 1968, 1976. A.B., Duke; M.S.L.S., N. Carolina
- GIBSON, J. TYRONE, Assoc. Professor (Pharmacy), 1972, 1976. B.S., M.S., Georgia; Ph.D., Mississippi

- GIBSON, MICHAEL L., Associate Professor (Management), 1988. B.S., Georgetown; M.B.A., D.B.A., Kentucky
- GILBERT, TAB, Assistant Safety Officer, Environmental Health, 1982, 1987. B.A., Auburn
- GILCHRIST, RONALD D., Manager, Op. & Maint., Nuclear Science Center, 1969, 1974. B.S., NW La. State
- GILES, HARRIET, Assistant Professor (Fam. & Child Dev.), 1983, 1985. B.S., M.S., Auburn; Ph.D., Georgia
- GILES, WILLIAM F., Professor (Management), 1974, 1984. B.A., Duke; M.A., Georgia; Ph.D., Tennessee
- GILMORE, DAVID E., Programmer III, Admin. Computing Svc., B.S., Troy State
- GINANNI, KATHRYN S., Librarian II, Library, 1988. B.A., Auburn; M.L.S., Peabody
- GLASSCOCK, SANDRA LOGAN, Research Associate, Ctr. for Governmental Svcs., 1986. B.A. Auburn
- GLAZE, LINDA S., Assistant Professor (Foreign Languages), 1979, 1980. B.A., Marietta; M.A., Ph.D., Wisconsin
- GLAZE, SUE, Librarian II, Library, 1985. B.G.S., AUM; M.L.S., Auburn
- GLUHMAN, JOSEPH W., Professor & Head (Art), 1987. B.A., Johns Hopkins; M.A., Western Reserve; Ph.D., Harvard
- GOETERS, HERMAN P., Associate Professor (Math-ACA), 1986. B.A., Sou. Conn. State; M.S., Ph.D., Connecticut
- GOFF, BRENT, Visiting Assistant Professor (Mktg. & Transp.), 1988. B.B.A., M.B.A., Idaho State; Ph.D., Arkansas
- GOFF, HAROLD F., Instructor (Ind. Engr.), 1971, 1976. B.S., Ohio State
- GOGGANS, PAUL M., Instructor (Elec. Engr.), 1985. B.S., M.S., Auburn
- GOLDMAN, HELEN E., Librarian II (Library), 1985. B.A., M.L.S., S. Carolina
- GOODLING, JOHN S., Professor (Mech. Engr.), 1968, 1980. B.M.E., M.S.E., Ph.D., Florida
- GOODLOE, GEORGE W., Manager, MS Facility, 1979. Ph.D., Penn. State
- GOODMAN, NINA D., Extension Program Associate (Rehab. & Spec. Ed.), 1986. B.S., Auburn
- GOODWIN, JOE S., Admin. Spec. Officer, International Programs, 1988. B.S., Tennessee Tech
- GOODYEAR, WILLIAM H., Visiting Professor (Aerosp. Engr.), 1987. B.S., Georgia; M.S., Florida; Ph.D., N.C. State
- GORDON, LLOYD B., Assistant Professor (Elec. Engr.), 1986. B.S., M.S., Ph.D., Texas Tech
- GOSDIN, ROBIN C., Nurse Practitioner, Student Health Center, 1987. B.S.N., AUM; M.S.N., UAB
- GOSSETT, CLAUDE W., JR., Associate Professor (Music), 1974, 1980. B.S., Lamar; M.C.M., SW Baptist Theol. Sem.; Ph.D., S. Mississippi
- GOSSETT, SYLVIA C., Instructor (Music), 1976. B.S., Lamar; M.M., Auburn
- GOVIL, NARENDRA K., Professor (Math-ACA), 1983, 1986. B.Sc., Agra-India; M.Sc., Aligarh-India; Ph.D., Montreal-Canada
- GRANEY, KATHLEEN M., Instructor (English), 1984. B.A., Dayton; M.A., St. Louis
- GRAVES, ANNE C., Mgr. Food Svc., Sewell Hall, 1969. B.S., Auburn
- GRAVES, RICHARD L., Professor (Curr. & Teach.), 1965, 1981. B.A., Baylor; M.Ed., Florida; Ph.D., FSU
- GRAY, BRUCE W., Associate Professor (Anat. & Histol.), 1972, 1979. D.V.M., Ph.D., Cornell
- GREEK, RAMONA A., Assistant Professor (Nursing), 1987. B.A., Pacific Union; B.S.N., UAB; M.A., Andrews; M.S.N., New Mexico; Ph.D., Texas Woman's University
- GREEN, CATHERINE S., Instructor (English), 1984. A.B., M.A., Ph.D., Ga. State
- GREEN, SAMUEL B., Professor (Psych.), 1974, 1979. B.A., W. Virginia; M.S., Marquette; Ph.D., Georgia
- GREENE, KATHERINE S., Research Associate (Psychology), 1987. B.S., Georgia; M.S., Miss. State; Ph.D., Alabama
- GREENE, MICHAEL E., Associate Professor (Elec. Engr.), 1986. B.E.E., M.S., Ohio State; Ph.D., Rice
- GREENLEAF, ROBERT B., Associate Professor (Music), 1974, 1981. B.M., FSU; M.M., D.M.A., LSU
- GREENSHIELDS, CHARLES M., Associate Professor (EFLT), 1969. B.A., M.A., Ph.D., Michigan State
- GREGG, MICHAEL S., Flight Instructor I, AU Aviation, 1988. B.S., Auburn
- GRESHAM, MARTHA M., Research Associate (Microb.), 1986. B.S., Alabama; M.S., Ph.D., Texas Woman's U
- GRESHAM, STEPHEN L., Associate Professor (English), 1975, 1984. B.S.E., M.A., Kansas STC; Ph.D., Missouri
- GRIFFIN, CHARLES M., Director, Engr. Student Svc. (Engr.), 1970, 1984. B.S., M.S., Auburn
- GRIFFIN, G. MICHAEL, Men's Golf Coach, Athletic Dept., 1984. B.S., Troy State
- GRIFFIN, JOYCE R., Academic Adviser, Coliseum, 1985. B.S., M.Ed., Troy State
- GRIGSBY, LEONARD L., Ga. Power Distinguished Professor (Elec. Engr.), 1984. B.S.E.E., M.S.E.E., Texas Tech; Ph.D., Oklahoma State
- GROOM, KENNETH N., Manager, Engineering Admin., 1987. B.A., M.S., Auburn
- GROPPER, DANIEL M., Instructor (Economics), 1988. B.A., Maryland; M.S., Ph.D., FSU
- GROPPER, SAREEN S., Assistant Professor (Nutrition & Foods), 1988. B.S., Maryland; M.S., Ph.D., Florida State
- GROSS, C. A., Square D Power Professor (Elec. Engr.), 1972, 1983. B.S., B.S.E.E., Alabama; M.S.E.E., Ph.D., Missouri-Rolla
- GROSS, ROBERT S., Assistant Professor (Aerospace Engineering), 1988. B.S., VPI; M.S., Ph.D., Clemson
- GROTH, AARON H., JR., Professor (Pathbiol.), 1957, 1964. B.S., D.V.M., Auburn; M.S., Iowa State
- GROVER, JANICE E., Instructor (Fam. & Child Dev.), 1982. B.S., M.S., Iowa State
- GRUENHAGE, GARY, Professor (Math-FAT) 1974, 1983. B.S., Nebraska; M.A., Ph.D., California
- GRYSKI, GERARD S., Associate Professor (Pol. Sci.), 1982, 1984. B.B.A., C.C.N.Y.; Ph.D., Massachusetts
- GUENTHER, ANN M., Assistant Professor (Clin. Ph. Prac.), 1981. B.S., NE La.; M.S., Houston
- GUFFEY, HUGH J., JR., Associate Professor & Head (Market. & Transp.), 1973. B.B.A., M.B.A., Ph.D., Georgia
- GUIN, JAMES A., Professor (Chem. Engr.), 1970, 1981. B.S., M.S., Alabama; Ph.D., Texas
- GUNDLACH, JAMES H., Associate Professor (Soc. and Anthro.), 1974, 1982. B.A., Oklahoma State; M.A., Ph.D., Texas
- GUTHRIE, PHILLIP, Coord. in Alumni & Devel., 1986. B.S., M.B.A., Auburn
- GUTHRIE, RICHARD L., Professor (Agron. & Soils), 1974, 1985. B.S., M.S., Auburn; Ph.D., Cornell
- GUVEN, OKTAY, Assoc. Professor (Civil Engr.), 1981, 1982. B.S., Robert; M.S., Ph.D., Iowa
- GUYER, CRAIG, Assistant Professor (Zoo-Wildlife), 1987. B.A., Humboldt State; M.S., Idaho State; Ph.D., Miami-Florida
- GWIN, MARY M., Instructor (English), 1987. B.A., Georgia; M.A., Auburn
- GWIN, WILLIAM R., JR., Professor (Architecture), 1973, 1984. B.Arch., Auburn; M.V.A., Georgia State; M.Arch., Pennsylvania
- GYNTHIER, MALCOLM D., Professor (Psychology), 1974. B.A., M.A., Stanford; Ph.D., Duke
- GYNTHIER, RUTH A., Instructor (Psychology), 1982. A.B., Montevallo; M.A., N. Carolina
- HAALAND, JOANNE M., Accountant, Contracts & Grants-Accounting, 1981. B.S., Auburn
- HACKWELL, STUART G., Research Associate (Agri. Engr.), 1988. B.Sc., M.Sc., McGill

- HAGGERTY, JOE K., *Elec. Engineer (Elec. Engr.)*, 1984. B.S.E.E., Auburn
- HALL, BRUCE, *Assistant Professor (Music)*, 1986. B.Mus., M.Mus., Michigan
- HALL, DAVID M., *Professor (Textile Engr. & Mat. Engr.)*, 1965, 1976. B.T.C., Auburn; M.S.T.C., Clemson; Ph.D., Victoria
- HALL, HINES H., III, *Associate Professor (History)*, 1967, 1982. B.A., Duke; M.A., Auburn; Ph.D., Vanderbilt
- HALL, MARK, *Systems Analyst I, Admin. Computing Svcs.*, 1986, 1988. B.S., Auburn
- HALL, MARTHA T., *Financial Aid Counselor, Student Financial Aid*, 1971, 1979. B.S., M.Ed., Auburn
- HALL, ROBERT E., *Visiting Instructor (Aerosp. Engr.)*, 1986. B.A., Illinois; M.S., Auburn
- HALL, THOMAS W., *Defensive Coordinator, Athletic Department*, 1981, 1986
- HALPIN, GERALD W., *Professor (EFLT)*, 1974, 1983. B.S., Jacksonville State; M.Ed., Ed.D., Georgia
- HALPIN, GLENELLE, *Professor (EFLT)*, 1974, 1984. B.S., Jacksonville State; M.A., Ph.D., Georgia
- HALVERSON, MELVIN B., *Assistant Professor (Voc. & Adult Ed.)*, 1976. B.S., M.S.Ed., N. Illinois; Ph.D., FSU
- HAMMERSMITH, JAMES P., *Associate Professor (English)*, 1978, 1984. B.A., Ph.D., Wisconsin
- HAMMETT, DILLARD J., *Assistant Bursar, Bursar's Office*, 1982. B.S., Auburn
- HAMRICK, MAYNARD E., *Professor (Pharmacal Sciences)*, 1967, 1981. B.S., M.S., Ph.D., Auburn
- HAND, JOHN H., *Professor (Finance)*, 1974, 1982. B.A., Swarthmore; Ph.D., MIT
- HANKERSON, DARREL R., *Assistant Professor (Math-ACA)*, 1987. B.S., M.S., Mankato State; M.A., Ph.D., Nebraska
- HANKES, GERALD H., *Professor (S. An. Surg. & Med.)*, 1969, 1978. B.S., D.V.M., Illinois; M.S., Ph.D., Colorado State
- HANRAHAN, LYNN A., *Assistant Professor (Pathobiol.)*, 1980, 1982. B.S., D.V.M., Purdue; M.S., Texas A&M; Ph.D., Auburn
- HANSEN, JAMES R., *Assistant Professor (History)*, 1986. B.S., Indiana; M.S., Ph.D., Ohio State
- HANSON, JAMES D., *Assistant Professor (Physics)*, 1984. B.A., Kalamazoo; M.S., Cornell; Ph.D., Maryland
- HARDIN, IAN R., *Associate Professor (Cons. Aff.)*, 1971, 1977. B.S., Auburn; M.S., Inst. of Textile Tech.; Ph.D., Clemson
- HARGIS, JAMES H., *Professor (Chemistry)*, 1970, 1982. B.S., Eastern New Mexico; Ph.D., Utah
- HARMON, KATHRYN S., *Accountant, University Bookstore*, 1987. B.A., B.S., Auburn
- HARPER, MARIE S., *Admin. Assistant (Agriculture)*, 1975, 1987
- HARPER, TERRY W., *TV Chief Engineer, Ed. TV*, 1969, 1976. B.A., Auburn
- HARRIS, GREG B., *Assistant Professor (Math-ACA)*, 1987. B.A., Cal State-Fullerton; M.S., Montana State; Ph.D., Utah
- HARRIS, JAMES R., *Associate Professor (Market. & Transp.)*, 1968, 1980. B.B.S., Emory; M.B.A., Ph.D., Florida
- HARRIS, PHYLLIS B., *Admin. Assistant (Human Sci.)*, 1977, 1983. A.S., S. Union
- HARRIS, STANLEY G., *Instructor (Management)*, 1986, 1987. B.S., N. Georgia; M.A., Ph.D., Michigan
- HARRISON, A. CLEVELAND, *Professor (Theatre)*, 1970, 1978. B.S., M.A., Ohio State; M.A., Arkansas; Ph.D., Kansas
- HARRISON, IAN WILLIAM, *Assistant Professor (Lg. An. & Surg.)*, 1986. B.V.Sc., M.V.S., Melbourne
- HARSHBARGER, FREDERICK F., *Asst. to the Dean (Vet. Med. Admin.)*, 1982, 1983. B.S., Auburn
- HARTLEY, SANDRA E., *Person. Spec., Univ. Personnel*, 1983. B.S., Alabama; M.S., Troy State
- HARTMAN, DIANE L., *Assistant Professor (Journalism)*, 1988. B.A., M.A., Alabama
- HARTSFIELD, NANCY M., *Associate Professor (Art)*, 1967, 1982. B.V.A., M.F.A., Auburn
- HARTZOG, WILEY G., JR., *Assistant Professor (Voc. & Adult Ed.)*, 1971, 1972. B.S., N. C. State; M.A., Appalachian State; Ed.D., Auburn
- HARZEM, PETER, *Hudson Professor & Acting Head (Psychology)*, 1978, 1984. B.Sc., (Hon.), London; Ph.D., Wales
- HATHFIELD, DONALD G., *Professor (Art)*, 1964, 1981. B.A., M.A., Michigan State; M.F.A., Wisconsin
- HATHCOCK, JOHN T., *Assistant Professor (Radiology)*, 1984. D.V.M., M.S., Auburn
- HATHCOCK, TERRI L., *Research Associate (Poultry Science)*, 1985, 1988. B.S., M.S., Auburn
- HAUGHT, PHYLLIS D., *Accounting, Financial Reporting*, 1989. B.S., W. Florida
- HAVENS, CAROLYN C., *Librarian II (Library)*, 1982. B.A., W. Florida; M.L.S., Kentucky
- HAWKINS, HERBERT N., *Assoc. Dean of Students*, 1966, 1984. B.S., M.S., Auburn
- HAWKINS, JO S., *Admin. Assistant (Sciences & Mathematics)*, 1967, 1987
- HAYES, VIRGINIA, *Associate Dean (Education)*, 1971, 1984. B.S., Samford; M.A., Ed.D., Alabama
- HAYGOOD, SUE H., *Adjunct Instructor (Accountancy)*, 1973. B.S., Alabama; M.B.A., Auburn
- HAYGREEN, JOHN C., *Associate Dean & Professor (Forestry)*, 1986. B.S., Iowa State; M.S., Ph.D., Michigan State
- HAYHURST, CAROLYN, *Director (Gen. Fin. & Acct.)*, 1977, 1984. A.B., W. Virginia; B.S., Auburn
- HAYNES, MAUREEN D., *Coord., Diag. & Eval. Center & Adj. Instructor (Rehab. & Spec. Ed.)*, 1977, 1983. B.A., M.A., N. Michigan
- HAYNES, WILLIAM O., *Professor (Comm. Dis.)*, 1976. B.S., M.A., N. Mich.; Ph.D., Bowling Green
- HAYS, DEAN S., *Instructor (Zoo.-Wildlife Sc.)*, 1984. B.S., Maryville; M.S., Auburn
- HEALEY, THOMAS, *Assistant Swimming Coach, Athletic Dept.*, 1985
- HEARD, CHARLES C., *Staff Physician, Student Health Ctr.*, 1988. B.S., Mercer; M.D., Med. Col. of Georgia
- HEARN, ROBERT A., *Assistant Editor, University Relations*, 1988. B.A., Auburn
- HEARN, WILLIAM C., *Coordinator, Engr. LRC*, 1973, 1975. B.A., Ed.S., Auburn; M.A., Appalachian; Ed.S., Georgia State
- HEATH, JO W., *Professor (Math-FAT)*, 1965, 1969. B.S., U.S.L., M.S., Auburn; Ph.D., Georgia
- HEBERT, ROBERT F., *Professor (Economics)*, 1974, 1980. B.S. M.S., Ph.D., LSU
- HECK, DONALD R., *Assistant Professor (Art)*, 1986. B.F.A., M.F.A., E. Tenn. State
- HEILMAN, JOHN G., *Associate Professor (Pol. Sci.)*, 1973, 1980. B.A., Lafayette; M.A., Ph.D., New York
- HEILMAN, URSULA M., *Instructor (Foreign Languages)*, 1984. B.A., Hamburg-Germany; M.Ed., Auburn
- HEIN, MICHAEL F., *Assistant Professor (Bldg. Sci.)*, 1987. B.S., Tulane; M.S., Princeton
- HELMKE, HENRY C., *Associate Professor (Foreign Languages)*, 1959, 1985. B.A., M.A., Duke; Ph.D., Ohio State
- HELMS, BARBARA B., *Systems Analyst II, University Computing*, 1988. B.S., Auburn
- HELMS, JOHN M., *Telecom. Network Spec. II, Telecom. & ETV*, 1989. B.S., Auburn
- HELTEN, JAMES, *Instructor (English)*, 1985. B.A., M.A., Ph.D., N. Dakota

- HENDERSON, BONNIE B., Admin. Asst.; VP Acad. Aff., 1968, 1986.
- HENDERSON, JOHNNY L., Alumni Asst. Professor (Math-ACA), 1984. B.S., M.S., Arkansas; Ph.D., Nebraska
- HENDERSON, RALPH A., JR., Associate Professor (S. An. Surg. and Med.), 1972, 1981. D.V.M., Missouri; M.S., Auburn
- HENDERSON, STEPHEN F., Systems Mgr., Engr. Admin., 1982. B.S., Auburn
- HENDRICK, JAMES T., Airport Operations Mgr. & Adj. Inst. (Auburn Aviation), 1975, 1982. B.S., M.S., Troy State
- HENDRICKS, CONSTANCE S., Instructor (Nursing), 1987. B.S.N., M.S.N., Alabama-Birmingham
- HENDRIX, CHARLES M., Assistant Professor (Pathobiol.), 1981. B.S., Clemson; D.V.M., Georgia; M.S., Ph.D., Minnesota
- HENDRIX, JAMES A., Associate Editor, AU Report, University Relations, 1987. B.A., N. Alabama
- HENDRIX, MARY E., Assistant Editor, Alumni Office, 1987. B.A., Auburn
- HENKELS, ROBERT M., Professor (Foreign Lang.), 1979. A.B., Princeton, M.S., Ph.D., Brown
- HENKLES, WICKHAM, Feature Writer (Mechanical Engr.), 1985, 1986. B.A., Elmhurst
- HENLEY, ATHA L., Life Sc. Librarian III (Library), 1970, 1983. A.B., Missouri Valley; M.L.S., California
- HENLEY, JAMES P., Visiting Assistant Professor (Chem. Engr.), 1988. B.S., Belhaven; M.S., Ph.D., Mississippi
- HENNEN, CATHY LYNN, Assistant Professor (Speech Comm.), 1986. B.A., W.Va. Wesleyan; M.S., Ph.D., Pittsburgh
- HENRY, RAYMOND P., Assistant Professor (Zoo.-Wildlife Sc.), 1983. B.S., M.A., William & Mary; Ph.D., Texas
- HENRY, RONALD J., Vice President for Academic Affairs, 1989. B.S., Ph.D., Queens (Belfast)
- HENSON, CURTIS T., JR., Associate Professor (History), 1966. B.S., M.A., Auburn; Ph.D., Tulane
- HENTON, JUNE M., Dean (Human Sci.) & Professor (Fam. & Child Dev.), 1985. B.S., Oklahoma St.; M.S., Nebraska; Ph.D., Minnesota
- HEPP, GARY R., Assistant Professor (Zoo.-Wildlife Sci.), 1985. B.S., Ohio St.; M.S., Clemson; Ph.D., N.C. State
- HERRING, BRUCE E., Professor (Ind. Engr.), 1965, 1973. B.I.E., Ohio St.; M.S.M.E., New Mexico St.; Ph.D., Oklahoma State
- HERRING, GINA, Instructor (English), 1981, 1988. B.A., Freed-Hardeman; M.A., Memphis St.; Ph.D., Auburn
- HERRING, REGINALD W., Assistant Football Coach, Athletic Dept., 1986. B.S., FSU
- HERRING, RONALD L., Director, Payroll & Employee Benefits, 1973, 1981. B.S., Troy State
- HERRING, SUZANNE N., Instructor (Nursing), 1987. B.S.N., Auburn; M.S.N., Troy State
- HETZER, GEORG, Professor (Math-FAT), 1986. B.S., M.S., D.Sc., Technical Univ. Aachen-W. Germany
- HICKS, DAVID R., Assistant Professor (Geography), 1988. B.A., Central Michigan; M.A., Ph.D., Michigan State
- HICKS, ROBERT T., Supervisor IV (Zoology-Wildlife Sci.), 1988.
- HIGGINS, EDWARD S., Resident Intern (Physiology & Pharmacology), 1988. D.V.M., Auburn
- HIGHILL, WILLIAM C., University Librarian, 1973. A.B. Okla. Baptist; M.S., Kansas STC; Ph.D., Illinois
- HILL, DAVID T., Alumni Professor (Ag. Engr.), 1979, 1985. B.S., M.S., Georgia; Ph.D., Clemson
- HILL, JOSEPH W., Mgr. Food Svc., War Eagle Cafe., 1982
- HILL, MICHAEL W., Wage and Class Coordinator, University Personnel Svc., 1974. B.A., M.Ed., Auburn
- HILL, PAUL D., Professor (Math-ACA), 1961, 1976. B.S., M.S., Ph.D., Auburn
- HILL, PAULETTE P., Assistant Dean (Human Sciences), 1988. B.A., Akron; M.Ed., Penn State; Ph.D., VPI
- HILL, WILLIAM Professor (Chemistry), 1970, 1982. B.S., M.S., FSU; Ph.D., Strathclyde
- HINATA, SATOSHI, Associate Professor (Physics), 1980. B.S., Tokyo; M.S., Ph.D., Illinois
- HINDS, SUSAN L., Library Associate, Library, 1978, 1986. B.S., Auburn
- HING, ALLAN M., Professor (Architecture), 1978, 1984. B.A., San Francisco State; B.F.A., Pratt; M.A., Syracuse
- HINRICHSEN, JOHN W., Associate Professor (Math-FAT), 1967, 1973. B.A., M.A., Ph.D., Texas
- HIRANYAVASIT, CHAIRAT, Instructor (Management), 1987. B.A., Chulalongkorn-Bangkok; M.S., Ga. State
- HIRTH, LEO J., C.I. Basore Professor (Chemical Engr.), 1962. B.S., CCNY; M.S., Ph.D., Texas
- HITCHCOCK, W. BERT, Professor & Head (English), 1966, 1984. B.A., Auburn; M.A., Oregon; Ph.D., Duke
- HIX, LEELYN G., Acad. Cmping. Spec. I, Acad. Cmptr. Svcs., 1985, 1986. B.S., M.S., Auburn
- HOBBS, VIVIAN B., Feature Writer (Philosophy), 1987. B.A., Auburn
- HODGE, TERRI M., Manager, Peet Theatre, B.A., Alabama
- HOERR, FRED J., Associate Professor (Path. & Parasit.), 1980, 1987. D.V.M., M.S., Ph.D., Purdue
- HOFFMAN, DEAN G., Professor (Math-ACA), 1977, 1987.
- HOLBROOK, BILLY H., Supervisor IV (Aerosp. Engr.), 1975, 1982.
- HOLCOMBE, RANDALL G., Lowder Professor (Economics), 1977, 1985. B.S., B.A., Florida; M.A., Ph.D., Va. Tech
- HOLLEY, WILLIAM H., Assoc. Dean, Academic Affairs (Business), & Professor (Management), 1969, 1986. B.S., M.B.A., Mississippi St.; Ph.D., Alabama
- HOLLOWAY, BOBBY E., Asst. Univ. Librarian (Library), 1980. B.A., Harding; M.S.L.S., Kentucky
- HOLLOWAY, JUANITA L., Instructor, ADM-Human Sciences, 1984, 1987. B.S., M.S., Auburn
- HOLMES, JOHN P., III, Professor (Math-FAT), 1972, 1984. B.S., Ga. Tech; M.A., Georgia; Ph.D., Emory
- HOLMES, JULIAN, Director, Alumni & Dev., 1971, 1979. B.S., M.S., Auburn; Ph.D., Tennessee
- HONNELL, ANGELINE H., Assistant Editor (Industrial Engr.) B.S., B.A., M.Ed., Auburn
- HONNELL, M.A., Professor (Elec. Engr.), 1958, 1983. B.S.E.E., M.S.E.E., E.E., Ga. Tech
- HOOL, JAMES N., Professor (Industrial Engr.), 1965, 1979. B.S., M.S., Ph.D., Purdue
- HOPKINS, BILL H., Professor & Head (Psychology), 1988. B.A., Emory; Ph.D., Indiana
- HOPKINS, DOUGLAS C., Assistant Professor (Elec. Engr.), 1988. B.S., M.S., SUNY; Ph.D., VPI
- HORNE, ROBERT D., Professor (S. An. Surg. & Med.), 1959, 1970. D.V.M., M.S., Auburn
- HORNSBY, KENNETH M., Manager (Elec. Engr.), 1974, 1985.
- HOUSE, DAVID E., Sports Info. Director, Athletic Dept., 1970, 1981. B.A., Auburn
- HOWARD, CURTIS S., Radiological Associate (Radiology), 1987. B.S., Alabama
- HOWARD, JEAN H., Specialist, Student Financial Aid, 1978, 1987. B.S., Auburn
- HOWARD, MARY JOE, Associate Professor (Music), 1969. B.M., Westminster; M.M., FSU
- HOWZE, GLENN R., Professor (Ag. Ec. & Rural Soc.), 1985. B.D., SMU; B.A., M.A., N. Texas St.; Ph.D., Washington State
- HUBBARD, MICHAEL G., Assoc. Sports Info. Dir., Athletic Dept., A.B.I., Georgia

- HUBBARD, SUSAN S., *Conference Facilitator, Conference Center*, 1988. B.S., M.Ed., Auburn
- HUBBS, JAMES M., *Visiting Assistant Professor (Architecture)*, 1987. B.T.N.T., B.Arch., Auburn; M.S., Georgia Tech
- HUDSON, CARL D., *Assistant Professor (Finance)*, 1988. B.S., Tennessee; M.S., Georgia Tech; Ph.D., Arizona State
- HUDSON, DON M., *Systems Support Spec. III (Computer Svc.)*, 1973, 1979. B.S., Auburn
- HUDSON, JUDITH A., *Resident (Radiology)*, 1983. B.S., Ontario; D.V.M., Guelph
- HUDSON, WILLIAM N., *Professor (Math-ACA)*, 1978, 1980. A.B., M.A., California; Ph.D., California-Irvine
- HUGGINS, CHRIS C., *Grad. Programs Spec., Graduate School*, 1986. B.A., Sou. Alabama
- HUGGINS, PETER M., *Instructor (English)*, 1985. B.A., Univ. of the South; J.D., Cumberland; M.F.A., Alabama
- HUGGINS, SYLVIA Y., *Accountant, Assistant Treasurer*, 1988. B.B.A., Columbus
- HUGHES, JOHN P., *Student Affairs Assistant, VP-Student Affairs*, 1988. B.S., Sanford; B.S., UAB; M.Ed., Montevallo
- HULING, CHARLES K., JR., *Assistant Director, Contract & Grants Accounting*, 1968, 1982. B.S., Auburn
- HUMBURG, JAY M., *Associate Professor (L. An. Surg. & Med.)*, 1973. B.S., D.V.M., Kansas State; M.S., Auburn
- HUMERICK, JEFFERY L., *Pharmacist, Temp. Office Svcs.*, 1988. B.S., Auburn
- HUNG, STEPHEN T., *Assistant Professor (Elec. Engr.)*, 1988. B.S.E.E., Tennessee; M.S., Ph.D., Illinois
- HUNTER, MARY R., *Assistant Director, Admissions*, 1974, 1977. B.A., Judson; M.Ed., Auburn
- HUSTON, WILLIAM F., *Assistant Professor (Building Science)*, 1988. B.S.C.E., Florida; M.B.A., Florida State
- HYDE, DIANA L., *Contract Specialist, VP-Research*, 1983, 1988
- HYDER, ANTHONY K., *Associate Professor (Physics) & Associate Vice President for Research*, 1982. B.S., Notre Dame; M.S., Ph.D., Air Force Institute of Tech
- ICENOGLU, DAVID W., *Assistant Professor (Geography)*, 1968. B.S., W. Illinois; M.A., Illinois; Ph.D., LSU
- ILLIES, ANDREAS J., *Assistant Professor (Chemistry)*, 1984. B.A., New Hampshire; M.S., Rochester Tech; Ph.D., Nebraska
- INMAN, ROBERT R., *Assistant Professor (Ind. Engr.)*, 1987. B.S., M.S., Illinois; Ph.D., Northwestern
- INNOCENTI, MARIO, *Assistant Professor (Aerosp. Engr.)*, 1987. B.S., Florence-Italy; M.S., Pisa; Ph.D., Purdue
- IRVIN, MELISSA Y., *Assistant Mgr., Foy Union*, 1986. B.S., M.Ed., Auburn
- IRWIN, DAVID E., *Assistant Professor (Music)*, 1988. B.M., Florida State; M.M., Yale
- IRWIN, J., *DAVID, Professor & Head (Elec. Engr.)*, 1969, 1976. B.E.E., Auburn; M.S., Ph.D., Tennessee
- ISHMAN, MARK C., *Supt. of Air Transp., AU Aviation*, 1983, 1987. B.S., Auburn
- JABLECKI-KRIEL, THERESA L., *Supervisor IV Laboratory (Mech. Engr.)*, 1985. B.S., Auburn
- JACKSON, JOHN D., *Associate Professor (Economics)*, 1978, 1984. B.A., M.A., Texas; Ph.D., Claremont
- JACOB, MARY A., *Contract Specialist, VP Research*, 1985, 1988
- JACOBS, JOHN O., *Assistant Training Counselor, Athletic Dept.*, 1988. B.S., Auburn
- JACOBSEN, BARRY J., *Professor (Plant Pathology)*, 1987. B.S., M.S., Wisconsin; Ph.D., Minnesota
- JACOBSON, MARCIA A., *Hargis Professor (English)*, 1978, 1984. B.A., M.A., Ph.D., California
- JAEGER, RICHARD C., *Alumni Professor (Elec. Engr.)*, 1979, 1983. B.S.E.E., M.E., Ph.D., Florida
- JAHERA, JOHN S., JR., *Assistant Professor (Finance)*, 1980, 1981. B.S., M.B.A., Ph.D., Georgia
- JAMES, SIDNEY N., *Assistant Professor (Elec. Engr.)*, 1966. B.S.E.E., M.S.E.E., Ph.D., Alabama
- JANER, ANN L., *Associate Professor (Clin. Pharm. Prac.)*, 1975, 1981. B.Sc. Phila. Pharmacy & Science; M.S. Temple
- JANG, BOR ZENG B., *Associate Professor (Mech. Engr.)*, 1982. B.S., Natl. Central-Taiwan; M.S., Ph.D., MIT
- JANSSEN, GISELE G., *Postdoctoral Fellow (Chemistry)*, 1988. B.Sc., M.Sc., Ph.D., Louis Pasteur
- JARVIS, JENNIFER, *Assistant Coord., Rec. Svcs.*, 1981, 1984. B.S., Auburn
- JAY, WILLIAM H., *Asst. Constr. Engr., Physical Plant*, 1976. B.S.C., Auburn
- JEANE, DONALD G., *Associate Professor (Geography)*, 1974, 1981. B.S., Ph.D., LSU
- JEFFERS, JOHN H., *Instructor (Religion)*, 1988. A.B.B., Howard
- JELKE, THEODORE J., *Admin. Proj. Mgr., Admin. Cmptrng. Svc.*, 1983. B.S.E.E., Purdue; M.B.A., S. Dakota
- JEMIAN, WARTAN A., *Professor (Mech. Engr. & Materials Engr.)*, 1962, 1965. B.S.Ch., Maryland; M.S., Ph.D., Rensselaer
- JENDA, OVERTOUN, *Assistant Professor (Math-ACA)*, 1988. B.Sc., Malawi; M.A., Ph.D., Kentucky
- JENKINS, RHONALD M., *Assistant Professor (Aerosp. Engr.)*, 1985. B.S., M.S., FSU; Ph.D., Purdue
- JENKINS, STEPHEN R., *Associate Professor (Civil Engr.)*, 1974, 1977. B.S.C.E., Ga. Tech; M.S., Ph.D., Harvard
- JENSEN, OVE WILLIAM, *Assistant Professor (Curr. & Teach.)*, 1966. B.M., M.M., Ed.D., Miami-Fla
- JENSEN, R.H. MARLIN, *Assistant Professor (Finance)*, 1988. B.A., Jamestown; M.B.A., Minnesota; Ph.D., Texas A&M
- JERNIGAN, MICHAEL G., *Managing Editor, Alumnews, Alumni Assoc.*, 1985, 1987. B.A., M.A., Auburn
- JESKE, WITOLD N., *Research Associate (Elec. Engr.)*, 1987. M.S., Ph.D., Warsaw U. of Tech
- JIANG, BERNARD C., *Assistant Professor (Ind. Engr.)*, 1984. B.E., Chung Yuan-Taiwan; M.S., Ph.D., Texas Tech
- JOBE, CYNTHIA A., *Research Associate, Ctr. for Governmental Svcs.*, 1988. B.A., M.S., Southern Illinois
- JOHNSON, BILLIE D., *Assistant Supr. Flight Instructor, AU Aviation*, 1988. B.S., USMA; M.B.A., AUM
- JOHNSON, CALVIN R., *Research Fellow, Space Power Institute*, 1988. B.S., USMA; M.S.E., Arizona State
- JOHNSON, EDNA B., *Instructor (Journalism)*, 1986. B.A., Auburn
- JOHNSON, EMMETT F., *Assistant Professor (Aerosp. Engr.)*, 1988. B.E.E., Auburn; M.S., Alabama;
- JOHNSON, EVERETT E., *Res. Mgr. (Forestry)*, 1979. B.S., N. C. State; M.S., Clemson
- JOHNSON, FREDERIC ALLAN, *Associate Professor (Chemistry)*, 1970. B.S., M.S., New Hampshire; Ph.D., Wisconsin
- JOHNSON, GERALD W., *Associate Professor & Head (Polit. Sc.)*, 1970, 1980. A.B., Marshall; M.A., Ph.D., Tennessee
- JOHNSON, JOAN B., *Manager, Freshman Chem. Labs.*, 1979, 1985. B.A., New Hampshire
- JOHNSON, LAWRENCE T., *Assistant Basketball Coach, Athletic Dept.*, 1983. B.A., Emory & Henry; M.S., Radford
- JOHNSON, OTIS, *Assistant Basketball Coach, Athletic Dept.*, 1986. B.S., Stetson
- JOHNSON, PETER D., *Professor (Math-ACA)*, 1980, 1986. Sc.B., Brown; Ph.D., Michigan
- JOHNSON, ROBERT E., *Associate Professor (Curr. & Teach.)*, 1978. B.M.E., M.M.E., Kansas; Ph.D., Michigan
- JOHNSON, ROBERT W., *Assistant Professor (Elec. Engr.)*, 1987. B.E.E., M.S.E.E., Vanderbilt; Ph.D., Auburn
- JOHNSON, WILEY C., JR., *Professor (Agron. & Soils)*, 1957, 1969. B.S., Wake Forest; B.S., M.S., N. C. State; Ph.D., Cornell

- JOHNSTON, JAMES K., *Dir. Ofc. of Bursar & Special Funds Acct.*, 1976, 1985. B.S., Auburn
- JOHNSTON, JAMES M., *Professor (Psychology)*, 1985. B.A., Tennessee; M.A., Ph.D., Florida
- JONES, ALLEN W., *Professor (History)*, 1966, 1974. B.S., M.A., Auburn; Ph.D., Alabama
- JONES, BILLY J., *Supvr., Art Dept., Univ. Print. Svc.*, 1959, 1983. Diploma, Ala. Tech College
- JONES, DOROTHEA E., *Admin. Assistant, (Architecture)*, 1976, 1987.
- JONES, EDWARD O., JR., *Assistant Dean, Engr. and Professor (Mech. Engr.)*, 1946, 1974. B.M.E., B.E.E., Auburn; M.S., Illinois
- JONES, ETHEL B., *Professor (Economics)*, 1975. A.B., Vassar; M.A., Ph.D., Chicago
- JONES, J. JANICE, *Admin. Assistant (Chemistry)*, 1983, 1987. B.A., Fisk
- JONES, THOMAS F., *Instructor (Curriculum & Teaching)*, 1989.
- JONES, TRACY, *Research Specialist (Geology)*, 1988. B.S., Alabama; M.S., Georgia
- JOO, DONGIK, *Assistant Professor (Ind. Engr.)*, 1987. B.S., Seoul National-Korea; M.S., Korea Adv. Inst. Sci. & Tech; Ph.D., Wisconsin
- KAETZ, JAMES P., *Instructor (English)*, 1986. B.A., Auburn; M.A., Alabama; Ph.D., N. Carolina
- KAETZ, JULIE F., *Instructor (English)*, 1983. B.A., Missouri Southern; M.A., Missouri
- KAER, HAROLD A., *Associate Professor & Head (Music)*, 1984. B.M., Peabody Conservatory; M.M., Arizona St.; Ph.D., N. Texas
- KALLENBERG, OLAV H., *Professor (Math-ACA)*, 1986. B.C.E., Lic. of Tech., Royal Univ. of Tech.-Stockholm; Dr. of Tech., Chalmers-Gothenburg
- KANDHAL, PRITHVI H., *Assistant Director (Civil Engr.)*, 1988. B.S., Rajasthan; M.S., Iowa State
- KAPLAN, BARBARA C., *Associate Professor (Curr. & Teach.)*, 1978. B.A., Agnes Scott; M.A., Eastman Music; M.A., S. Florida; Ph.D., FSU
- KASERMAN, DAVID L., *Professor & Head (Economics)*, 1987. B.S., Tennessee; Ph.D., Florida
- KATANIN, V. LOUISE, *Instructor (Foreign Languages)*, 1987. B.A., British Columbia; M.A., Middlebury; Ph.D., California-Berkeley
- KEIL, TERRI L., *Intern (Sm. An. Surg. & Med.)*, 1988. B.S., D.V.M., Missouri
- KEITH, ROBERT E., *Associate Professor (Nutrition and Foods)*, 1978, 1983. B.S., M.S., FSU; Ph.D., Va. Tech
- KELLEY, THURSTON R., *Operations Manager, Computer Center*, 1966, 1975
- KELLEY, VIRGINIA C., *Associate Professor (Bot. & Microb.)*, 1969, 1981. A.B., LaGrange; M.S., Ph.D., Auburn
- KELLY, WILLIAM E., *Assistant Professor (Pol. Sci.)*, 1973, 1974. B.A., St. Michael's; M.A., New Mexico State; Ph.D., Nebraska
- KELLY, WILLIAM H., *Syst. Sup. Specialist III, University Computing*, 1988. B.S., South Alabama
- KEMPE, STEPHEN C., *Assistant Professor (Zoo.-Wildlife Sc.)*, 1985. B.S., Case-Western Reserve; Ph.D., Hawaii
- KEMPPAINEN, BARBARA W., *Assistant Professor (Pharm. Sci.)*, 1984, 1986. B.S., Ashland; M.S., Ohio State; Ph.D., Georgia
- KEMPPAINEN, ROBERT J., *Associate Professor (Physiol. & Pharmacol.)*, 1982, 1986. B.S., D.V.M., Michigan St.; Ph.D., Georgia
- KENNEDY, THOMAS A., *Assistant Manager, Coliseum*, 1986, 1988. B.A., M.A., Ohio
- KENNON, WALTER P., *Assistant Professor (Management)*, 1987. B.S., Auburn; M.B.A., Ph.D., Chicago
- KEOWN, ALTON C., *Adjunct Instructor (Arch.)*, 1985. B.A., W. Kentucky
- KEOWN, WANDA H., *Associate Director, Univ. Computing*, 1983, 1986. B.S., W. Kentucky
- KEPNER, GLORIA, *Instructor (HHP)*, 1984. B.S., M.S., Baylor
- KERNER, MARY T., *Instructor (Foreign Language)*, 1988. B.A., Maryland
- KHODADADI, JAY M., *Assistant Professor (Mech. Engr.)*, 1980, 1986. B.S., M.S., Ph.D., Illinois
- KHODADADI, KAREN, *Research Associate, Ctr. for Governmental Svcs.*, 1988. B.S., M.S., Illinois
- KICKLIGHTER, JOSEPH A., *Associate Professor (History)*, 1975, 1980. B.A., U. of the South; M.A., Ph.D., Emory
- KILGORE, T. ALBERT, *Assistant Professor (Math-ACA)*, 1985. A.B., Michigan; Ph.D., Texas
- KILLIAN, JAMES L., III, *Assistant Editor, University Relations*, 1974, 1984. B.S.J., Ohio
- KILLINGSWORTH, ROGER A., *Assistant Professor (Bldg. Science)*, 1985. B.S., M.S., Texas A&M
- KING, CYNTHIA A., *Admissions Counselor, Admissions*, 1988. B.A., Auburn
- KING, DAVID T., JR., *Associate Professor (Geology)*, 1980, 1986. B.S., NE Louisiana; M.S., Houston; Ph.D., Missouri
- KING, GLEN D., *Professor (Psychology)*, 1988. B.A., Minnesota; M.S., Ph.D., Florida State
- KING, JOHN W., *Asst. Rad. Safety Officer, Safety & Environ. Health*, 1981, 1982. B.S., Auburn
- KING, LESTER C., *Manager, Photographic Service*, 1949, 1962
- KING, LYNDA S., *Admin. Assistant (Pathobiology)*, 1978, 1988.
- KINGERY, WILLIAM L., *Librarian II, Library*, 1988. B.S., M.S., LSU; M.L.S., Alabama
- KINZER, EARL T., JR., *Associate Professor (Physics)*, 1967. B.E.P., M.S., Auburn; Ph.D., Virginia
- KINZER, MARY J., *Accountant, Contracts & Grants Accounting*, 1978. B.S., Auburn
- KIRK, JOHN H., *Professor & Head (Lg. An. Surg. & Med.)*, 1988. B.S., D.V.M., Texas A&M; M.S., Rochester
- KITELEY, GARY W., *Director, AU Aviation, Associate Professor (Av. Mgmt.)*, 1965, 1970. B.S., Minnesota; M.S., Purdue
- KNECHT, CHARLES D., *Professor & Head (S. An. Surg. & Med.)*, 1979. B.S., Maryland; V.M.D., Pennsylvania; M.S., Illinois
- KNIGHT, LISA A., *Academic Counselor, Athletic Dept.*, 1987. B.B.A., Georgia; M.Ed., Auburn
- KNIGHT, RICHARD D., *Nuc. Sci. Specialist, Nuclear Science Ctr.*, 1973.
- KNIGHT, ROY W., *Assistant Professor (Mech. Engr.)*, 1986. B.S.M.E., M.S., Maryland; Ph.D., Texas
- KNIPSCHILD, ANN K., *Assistant Professor (Music)*, 1985. B.S., B.M., Missouri; M.M., Yale; D.M.A., SUNY-Stony Brook
- KNOWLTON, STEPHEN F., *Visiting Assistant Professor (Physics)*, 1988. A.B., Middlebury; Ph.D., MIT
- KOHL, HERBERT H., *Associate Professor (Chemistry)*, 1974, 1982. B.S., CCNY; M.S., Kansas; Ph.D., California
- KONSTANT, GEORGE C., *Contract Specialist, VP-Research*, 1986. B.S., B.A., Auburn
- KOUIDIS, VIRGINIA M., *Associate Professor (English)*, 1974, 1981. B.A., Michigan State; M.A., Ph.D., Iowa
- KOWALSKI, GREGORY S., *Associate Professor & Dir., Criminology (Socio.)*, 1975. B.A., B.S., Moorhead; M.A., N. Dakota; Ph.D., Kentucky

- KOWBEL, WITOLD, Assistant Professor (Mech. Engr.), 1986. M.S., Wrocław; Ph.D., Sou. Illinois
- KOZLOWSKI, GEORGE, Professor & Head (Math-FAT), 1976, 1986. B.A., Wesleyan; Ph.D., Michigan
- KOZLOWSKI, YVONNE L., Librarian III & Head Social Sciences (Library), 1977, 1984. B.A., M.A., M.L.S., Washington
- KRASKA, MARIE F., Assistant Professor (Voc. & Adult Education), 1988. B.S., M.S., Wisconsin; Ph.D., Missouri
- KRIEL, RONALD J., Safety Officer, Environ. Health, 1982, 1987. B.S., Auburn
- KRISHNAGOPALAN, ARAVAMUTHAN, Assistant Professor (Chem. Engr.), 1984, 1985. B.S., Madras-India; B.S., Bombay-India; M.S., Ph.D., Maine
- KRISHNAPRASAD, S., Instructor (Comp. Sc. Engr.), 1986. B.A., Bangalore; M.S., Indian Inst. of Sc.-India
- KRISTA, LAVERNE M., Professor (Anat. & Hist.), 1969, 1979. B.S., M.S., S. Dakota State; D.V.M., Ph.D., Minnesota
- KRYLSTEDT, PETER G., Visiting Assistant Professor (Physics), 1988. M.S.C., Liceut., Ph.D., Royal Inst. Technology
- KUERTEN, BRUCE, Producer-Director III, Ed. TV, 1979. B.A., M.F.A., Yale
- KUERTEN, KIMBERLY A., Instructor (Management), 1984. B.S., M.B.A., Auburn
- KUPERBERG, KRISTYNA M., Professor (Math-FAT), 1974, 1984. M.S., Warsaw; Ph.D., Rice
- KUPERBERG, WLODZIMIERZ, Professor (Math-FAT), 1974, 1982. M.S., Ph.D., Warsaw
- KWAPIEN, ROBERT P., Associate Professor (Pathobiol.), 1978. D.V.M., Georgia; Ph.D., Colorado State
- LA FON, ALAN, Assistant Professor (Architecture), 1986. B.Arch., Cal Poly; M.Arch., Texas A&M
- LA HAIE, BRIAN J., Assistant Professor (Architecture), 1986. B.S., Sou. Illinois; M.L.A., Illinois
- LAI, MICHAEL, Research Associate (Pharmacy Care Sys.), 1988. B.S., M.S., Auburn
- LAKIN, ELIZABETH B., Assistant Director, Payroll and Employee Benefits, 1968
- LAMAR, ANN, Ext. Prgm. Assoc. (Rehab. & Spec. Ed.), 1985. B.S., Auburn
- LAMAR, JAY, Coordinator, Ctr. for Arts & Humanities, 1988. B.A., Auburn
- LAMBERT, KELLY G., Assistant Professor (Psychology), 1988. B.A., Samford; M.S., Ph.D., Georgia
- LAMBERT, ZARREL V., Liberty Nat. Prof. (Market. & Transp.), 1977. B.B.A., M.B.A., Ga. State; Ph.D., Penn. State
- LAMKE, LEANNE K., Associate Professor (Fam. & Child Dev.), 1986. B.A., North Dakota; M.S., Ph.D., Texas Tech
- LANDER, JEFFREY, Assistant Professor (HHP), 1984. B.A., Hamline; M.S., Ph.D., Oregon
- LANE, HELEN W., Professor & Head (Nutrition & Foods), 1984. B.S., Cal-Berkely; M.S., Wisconsin; Ph.D., Florida
- LANEY, JAMES W., System Suppt. Spec. III, Tech. Suppt., 1983. B.S.A.E., Auburn
- LANGE, DAVID R., Instructor (Finance), 1988. B.S., Northern Kentucky; M.A., D.B.A., Kentucky
- LANIER, TARA A., Library Associate, Library, 1987. B.A., Auburn
- LAPOINTE, ADRIANE, Assistant Professor (English), 1986. B.A., Emory; M.A., Ph.D., Chicago
- LARGE, DONALD L., JR., Controller, Business Office, 1986. B.S., Auburn
- LARKIN, JOHN R., Assistant Trainer, Athletic Dept., 1981. B.S., M.Ed., Auburn
- LARKIN, VIVIAN M., Coordinator, VP-Student Affairs, 1986, 1987. B.S., Tuskegee; M.S., Alabama
- LAROUX, LEONARD, Assistant Professor (Art), 1985. B.A., M.F.A., S. Illinois-Edwardsville; M.A., SUNY-Albany
- LARSEN, HARRY S., Associate Professor (Forestry), 1959, 1970. B.S., Rutgers; M.S., Michigan State; Ph.D., Duke
- LASTINGER, MICHAEL D., Assistant Professor (Foreign Languages), 1987. B.A., Valdosta; M.A., Ph.D., Georgia
- LATIMER, DAN, Associate Professor (English), 1972, 1978. B.A., Texas; M.A., Ph.D., Michigan
- LATIMER, MARGARET K., Associate Professor (Polit. Sci.), 1966, 1982. B.A., Agnes Scott; M.A., Vanderbilt
- LATIMER, PAUL H., Professor (Physics), 1962, 1971. B.S., Northwestern; M.S., Ph.D., Illinois
- LATIMER, RENATE, Associate Professor (Foreign Languages), 1973, 1984. A.B., Wayne State; M.A., Ph.D., Michigan
- LAU, TIN, Assistant Professor (Ind. Design), 1986. B.S., National-Taiwan; M.A., Ohio State
- LAUDERDALE, WILLIAM B., Professor (EFLT), 1964, 1982. B.S., Ed.M., Illinois; Ph.D., Michigan State
- LAUMER, J., FORD, JR., Assistant Professor (Market. & Transp.), 1973, 1975. B.C.E., M.B.A., Auburn; Ph.D., Georgia
- LAWHON, ERNESTINE, Assistant Director, Student Housing, 1972, 1980. B.S., M.A., Alabama
- LAWLESS, WILLIAM B., Instructor (Art), 1988. B.F.A., Rutgers; M.F.A., SUNY
- LAWRENCE, FAYE B., Assistant Professor (Zoo.-Wildlife Sc.), 1946, 1959. B.S., Huntingdon; M.S., Auburn
- LAWRENCE, JAMES D., Counselor, Student Dev. Svcs., 1987. B.S., M.Ed., Auburn
- LAZARUS, HERMAN L., Associate Professor (Clin. Ph. Prac.), 1975, 1981. B.S., M.S., Mississippi
- LEACH, JAMES A., Coord., Engr. Graphics Labs, (Ind. Engr.), 1976, 1986. B.Ind., Auburn
- LEBLANC, RALPH D., Colonel, USAF, Professor (Aerosp. Studies), 1987. B.S., La. Tech; M.A., Central Michigan
- LECHNER, JUDITH V., Instructor (EFLT), 1988. B.S., CCNY; M.L.S., Columbia; M.S.E., Auburn
- LECHNER, NORBERT M., Associate Professor (Build. Sci.), 1974, 1982. B.Arch., CCNY; M.S., Columbia
- LEDBETTER, HOSIA, Supervisor IV (Sm. An. Surg. & Med.), 1988
- LEDBETTER, LOWELL, Director, Foy Union, 1964, 1972. B.S., M.Ed., Auburn; M.Div., New Orleans Theol. Seminary
- LEDBETTER, WILLIAM N., Associate Professor (Management), 1972, 1981. B.S.I.E., Alabama; M.S., Georgia Tech; Ph.D., Oklahoma State
- LEDFORD, BRUCE R., Associate Professor (EFLT), 1985. B.S., M.A., Ed.D., East Tenn. State
- LEE, YOON Y., Professor (Chem. Engr.), 1974, 1984. B.S., Seoul; M.S., S. Carolina; Ph.D., Iowa State
- LEGG, J. IVAN, Dean, Sciences & Mathematics, 1987. B.A., Oberlin; Ph.D., Michigan
- LEGRAND, MARK S., Visiting Assistant Professor (Math-FAT), 1988. B.A., M.S., Iowa State; Ph.D., Penn State
- LEISCHUCK, EMILY R., Assistant to the President, 1974, 1983. B.S., Alabama; M.Ed., Auburn
- LEISCHUCK, GERALD S., Director, Planning & Analysis, 1962, 1966. A.B., M.A., N. Colorado; Ed.D., Auburn
- LENARD, TOMMY C., Head Producer/Director, Telecom & ETV, 1976. A.A., Southern Union
- LENOIR, CLINTON H. JR., Ext. Program Assoc., ATAC (SRP), 1982. B.S., B.S., M.B.A., Auburn
- LEONARD, DOUGLAS A., Associate Professor (Math-ACA), 1981. B.S., Michigan; Ph.D., Ohio State
- LEONARD, LEIGH A., Ext. Prog. Associate, Rehab. & Special Ed.), 1988. B.S., Auburn
- LETT, VIOLET S., Accountant, Gen. Fin. & Acct., 1965, 1983
- LEWANDOWSKI, JOHN, Assistant SID, Athletic Dept., 1984. B.S., Notre Dame
- LEWIS, BRUCE R., Director, University Cmptng., 1982, 1986. B.S., E. Kentucky; M.S., New Mexico State

- LEWIS, JEFFERY S., Assistant Professor (Art), 1988. B.A., SUNY-Brockport; M.A., M.F.A., Iowa
- LEWIS, PHILIP M., Professor (Psychology), 1977. B.A., Hamilton; M.S., Ph.D., Syracuse
- LEWIS, RONALD D., Assistant Professor (Geology), 1984. B.S., Iowa; Ph.D., Texas
- LEWIS, W. DAVID, Hudson Professor (History and Engr.), 1971. B.A., M.A., Penn State; Ph.D., Cornell
- LEY, TERRY C., Associate Professor (Curr. & Teach.), 1974, 1981. B.A., N. Iowa; M.A., Ph.D., Iowa
- LIN, CHING-MING, Research Associate (Chem. Engr.), 1979. B.S., National Taiwan; M.S., Auburn
- LIN, HENRY, Professor (Math-FAT), 1987. B.S., Yale; M.A., Ph.D., Chicago
- LINDHOLM, BYRON W., Associate Professor (Fam. & Child Dev.), 1972, 1974. A.B., Northwestern; Ph.D., Illinois
- LINDLEY, DENISE M., Resident (S. An. & Surg.), 1985, 1986. B.S., D.V.M., Illinois
- LINDNER, CHARLES C., Alumni Professor (Math-ACA), 1969, 1985. B.S., Presbyterian; M.S., Ph.D., Emory
- LINDSEY, JOHN M., Electrical Engineer (Elec. Engr.), 1987. B.S., M.S., Auburn
- LISANO, MICHAEL E., Act. Assoc. Grad. Dean & Associate Professor (Zoo-Wildlife Sc.), 1970, 1986. B.S., M.S., Sam Houston; Ph.D., Texas A&M
- LISHAK, ROBERT S., Associate Professor (Zoo-Wildlife Sc.), 1976, 1981. B.S., Seton Hall; Ph.D., Ohio State
- LITTLETON, TAYLOR D., Mosley Professor (English) 1957, 1984. B.S., M.A., Ph.D., FSU
- LIVANT, PETER D., Associate Professor (Chemistry), 1977, 1984. B.S., CCNY; Ph.D., Brown
- LIVERANCE, DARWIN D., Director, Personnel Svcs., 1987. B.A., Michigan State; M.Ed., Indiana
- LLOYD WILLIAM P., Professor & Head (Finance), 1979, 1983. B.S., Florida; M.B.A., D.B.A., Indiana
- LOCKHART, DAVID, Manager, Food Services, 1955, 1984
- LOCKLAR, ELBA A., Manager, U. Print. Svc., 1960, 1980
- LOCKLAR, MARTHA S., Oncampus Recruit. Coord., Athletic Department, 1977, 1984
- LOCKROW, A. LYNN, Assistant Professor (Theatre), 1985. B.S., E. Tenn. State; M.F.A., N. Carolina-Greensboro
- LODEN, D. KEVIN, Assistant Editor, Publications, University Relations, 1985. B.A., Auburn
- LODEN, JO ANN J., Financial Aid Counselor, Student Financial Aid, 1983. B.S., N. Alabama; M.Ed., Auburn
- LOGUE, HANCHEY E., JR., Professor (Journalism), 1964, 1983. B.S., M.A., Auburn
- LONG, GLENN W., Research Associate, Center for Govt. Svc., 1984. B.A., B.S., Auburn; M.S., G. Washington
- LONG, JAMES E., Torchmark Professor (Economics), 1974, 1983. A.B., Erskine; M.S., Ph.D., FSU
- LONG, LARRY R., Coord., Placement Svc., 1985; B.S., Montevallo; M.S., Troy State
- LORD, MICHAEL W., Supervisor IV (Lg. An. Surg. & Med.), 1977
- LOVE, BRIAN, Assistant Professor (Chemistry), 1987. B.S., TCU; Ph.D., Princeton
- LOVE, CATHERINE C., Civil Engineer, Tech Svcs., 1984, 1986. B.S., Ga. Tech
- LOVE, JANE S., Cont. Education Inst., Continuing Education, 1988. B.S., Auburn
- LOVE, THOMAS A., Instructor (Bldg. Sci.), 1987. B.S., Auburn; M.S., Colorado State
- LOVELL, RICHARD T., Professor (Fish. & Allied Aqua.), 1969, 1975. B.S., M.S., Oklahoma State; Ph.D., LSU
- LOVVORN, KAYE F., Editor, The Alumnews, 1965, 1968. B.A., Auburn
- LOWRY, JAMES LEE, Professor (Elec. Engr.), 1955, 1965. B.E.E., M.E., Auburn; Ph.D., Florida
- LOWTHER, GUERRY S., JR., Coord., Mgt. Info. Systems, Planning & Analysis, 1978, 1983. B.S., Auburn
- LUNDELL, CLARK E., Professor & Acting Head (Architecture), 1977. B.E.D., M.A., Texas A&M
- LUTHER, WILLIAM A., JR., Contracts & Grants, Dev. Spec. to VP-Research, 1981, 1985. B.S., West Point; M.A., Auburn
- LUTTRELL, KAREN L., Assistant Director, Admissions, 1981; B.A., Va. Tech; M.A., Auburn
- LYNCH, W. KENNETH, Professor (Textile Engr.), 1975. B.S., M.S., N. C. State; Ph.D., Leeds
- MacDONALD, JOHN M., Associate Professor (S. An. Surg. & Med.), 1980. B.Ed., M.Ed., Plymouth St.; D.V.M., Cornell
- MACHAN, TIBOR R., Professor (Philosophy), 1986. B.A., Claremont; M.A., NYU; Ph.D., Calif.-Santa Barbara
- MACK, CHARLES G., Director, Admin. Facilities, 1987. B.A., Miami
- MADDIX, DAVID K., Superintendent, Student Housing, 1985, 1986
- MADRIGAL, JOSE A., Professor (Foreign Languages), 1970, 1983. B.A., M.A., Michigan State; Ph.D., Kentucky
- MADSEN, NELS H., Associate Professor (Mech. Engr.), 1978, 1985. B.A., M.S., Ph.D., Iowa
- MAGHSOODLOO, SAIED, Professor (Industrial Engr.), 1966, 1984. B.S., M.S., Ph.D., Auburn
- MAGYAR, PETER, Professor (Architecture), 1981, 1984. M.Arch., Budapest; Ph.D., Ahmadu Bello-Nigeria
- MAINS, CHARLES, Director, General Finance & Accounting, 1965, 1973. B.S., Kent State; LL.B., Jones Law Institute
- MALIK, RASHID A., Assistant Professor (Geography), 1988. M.A., Punjab; S.M. Chicago; Ph.D., Indiana
- MANN, MICHAEL D., Manager, Vet. Med. Admin., 1986. B.A., Kenyon; M.A., Maxwell
- MANOCHA, HARUANS L., Visiting Professor (Math-ACA), 1988. B.A., M.A., Cert., Ph.D., Punjab
- MANSFIELD, PHILIP D., Assistant Professor (S. An. Surg. and Med.), 1978. D.V.M., Auburn
- MAPLES, GLENNON, Professor (Civil Engr.), 1966, 1976. B.S., M.S., Miss. State; Ph.D., Oklahoma State
- MAPPIN, KITA, Feature Writer (Mech. Engr.), 1984. B.A., AUM; M.A., Auburn
- MARCINKO, DOROTHY, Librarian III, Head, Acq. Dept. (Library), 1975, 1984. A.B., Philippines; M.L.S., Texas Woman's Univ.; Ed.S., Auburn
- MARION, JAMES E., Dean of Agriculture, 1988. B.S., Berea; M.S., Kentucky; Ph.D., Georgia
- MARKLE, ANNE H., Assistant Professor (Art), 1977, 1983. B.F.A., M.F.A., Maryland Inst. of Art
- MARPLE, DENNIS N., Professor (An. & Dairy Sc.), 1973, 1984. B.S., M.S., Iowa State; Ph.D., Purdue
- MARSEE, DWIGHT L., Women's Golf Coach, Athletic Dept., 1984. B.S., FSU; M.S., Indiana
- MARSHALL, ARVLE E., Assistant Professor (Anat. & Histol.), 1982. B.S., Texas Tech; D.V.M., Texas A&M; Ph.D., Missouri
- MARTIN, DAVID L., Professor (Pol. Sci.), 1973, 1983. B.A., Redlands; M.A., Ph.D., Claremont
- MARTIN, FRANCES S., Systems Analyst I, Admin. Cmping. Svc., 1980, 1982. B.S., Auburn
- MARTIN, JAMES E., President & Professor (Ag. Ec. & Rural Soc.), 1984. B.S., Auburn; M.S., N.C. State; Ph.D., Iowa State
- MARTIN, MARY C., Visiting Instructor (Architecture), 1987. B.Arch., Auburn
- MARTIN, PAUL E., Proj. Coord., Archives & Records Mgmt., U. Archives, 1984. B.Sc., Ohio State; M.A., Auburn
- MARTIN, RICHARD H., Research Associate (Forestry), 1987. B.S., M.S., Tennessee

- MARTINSON, TOM L., Professor & Head (Geography), 1987. B.A., Oregon; Ph.D., Kansas
- MARVEL, MASON E., Acting Director, Ctr. for Int'l Progs., 1984. B.S., Massachusetts; M.S., Va. Tech; Ph.D., W. Virginia
- MASON, WILLIAM H., Alumni Professor (Zoo.-Wildlife Sc.), Associate Dean, Sciences & Math, 1966, 1987. B.S., Arkansas Tech., M.Ed., Ed.D., Georgia
- MATTHEWS, CAROLYN G., Instructor (HHP), 1988. B.A., Birmingham Southern; M.Ed., Auburn
- MATTHEWS, MAURICE S., JR., Director, Cont. Ed. & Asst. Dean, Gen. Ext. & Pub. Svc., B.A., M.S., Ed.D., Virginia
- MAYFIELD, MARGARET A., Instructor (Mktg. & Transp.), 1985. B.A., Auburn; J.D., Cumberland; M.B.A., Samford
- MCCARTHER, FRANCES C., Administrative Assistant (Library), 1969, 1983
- MCCANN, MAIDA A., Instructor (Nursing), 1987. R.N., Washington Hosp. Ctr.; B.S., Ga. Southwestern; M.S.N., Troy State
- McCLAIN, WILLIAM D., Mgr., Terrell Dining Hall, 1983, 1985.
- McCLANAHAN, MICHAEL C., Ext. Prog. Associate (Rehab. & Special Ed.), 1988. B.S., Auburn; M.Ed., Georgia
- McCLENDON, LYDIA S., Assistant Director II, Alumni Office, 1987. B.A., Auburn
- McCONATHA, JASMIN T., Assistant Professor (Couns. & Couns. Psychology), 1988. B.S., B.A., Utah; M.S., Jacksonville St.; Ph.D., Georgia
- McCORD, SAMMY O., Associate Professor (Finance) & Acting Dir., Ctr. for Int'l Commerce, 1973, 1983. A.B., LaGrange; M.B.A., Auburn; Ph.D., Arkansas
- McCOY, JAMES F., Associate Professor (Psychology), 1973, 1978. B.S., M.S., Ph.D., Memphis State
- McCOY, JANET L., Associate Editor, University Relations, 1986. B.S., Troy State
- McCULLERS, GAIL H., Director, Student Housing, 1961, 1980. B.S., M.Ed., Auburn
- McDANIEL, RANDALL S., Associate Professor (Rehab. & Spec. Ed.), 1972, 1983. B.S.O.T., M.R.C., Florida; Ed.D., Auburn
- McDONOUGH, JAMES L., Professor (History), 1988. B.A., David Lipscomb; M.A., Abilene Christian; Ph.D., FSU
- McDONOUGH, JAMES L., Assoc. V.P. Bus. & Finance, 1977, 1985. B.S., Scranton; M.Ed., Auburn
- McFARLAND, STEPHEN L., Assistant Professor (History), 1981. B.A., Kansas; M.A., Ph.D., Texas
- McGEE, VIKKI A., Director & Res. Prgm. Assoc. (Curr. & Teach.), 1985. B.S., M.E., S. Alabama
- McGINTY, R. MARTY, Assistant Ticket Mgr., Athletic Dept., 1977. B.S., Auburn
- McIVER, ALLEN, Construction Engineer, Facilities, 1986.
- McKEE, MICHAEL L., Associate Professor (Chemistry), 1981, 1988. B.S., Lamar; Ph.D., Texas
- McKOWN, DELOS BANNING, Professor and Head (Philosophy), 1962, 1979. B.A., Alma; B.D., College of the Bible (Kentucky); M.A., Kentucky; Diploma, Geneva (Switzerland); Ph.D., FSU
- McLEAN, MARY E., Assistant Professor (Rehab. & Spec. Ed.), 1982. B.A., Iowa; M.A., Peabody; Ph.D., Wisconsin
- McMILLAN, DENNIS M., Assistant Professor (Clin. Phar. Prac.), 1984. B.S., Samford; Pharm. D., Auburn
- McNEAL, MARRELL J., Instructor (Mkt. & Transp.), 1981. B.A., Auburn; J.D., Cumberland-Samford
- McPHEETERS, E. KEITH, Professor (Architecture), 1969, 1988. B.Arch., Oklahoma State; M.F.A., in Arch., Princeton
- MEADOWS, MARK E., Professor & Head (Couns. & Couns. Psych.), 1969, 1972. B.S., Georgia Sou.; M.A., Peabody; Ed.D., Georgia
- MEANS, RICHARD K., Professor (HHP), 1964. B.S., M.A., Minnesota; Ed.D., UCLA
- MEHTA, JAGJIVAN RAM, Post Doctoral Fellow, Scott-Ritchey Research, 1986. B.S., M.S., Punjab-India; Ph.D., Postgrad. Institute-India
- MEHTA, MEENA, Research Associate (Pharm. Sci.), 1987. M.S., Himachal Pradesh
- MELANCON, MICHAEL S., Assistant Professor (History), 1984. B.A., Loyola-New Orleans; M.A., Ph.D., Indiana
- MELIUS, PAUL, Professor (Chemistry), 1957, 1965. B.S., Bradley; M.S., Chicago; Ph.D., Loyola of Chicago
- MELVILLE, JOEL G., Associate Professor (Civil Engr.), 1979. B.S. Ph.D., Penn. State; M.S., Texas
- MELVIN, EMILY A., Associate Professor (Curr. & Teach.), 1976, 1983. B.S., Old Dominion; M.S., E.Ed., Virginia
- MERRITT, CLEMENTS B., Assistant Professor (Av. Mgmt.), 1975, 1979. B.M.E., Florida; M.S.A.E., Air Force Inst. Tech
- MEYER, DARRELL C., Professor (Architecture), 1978, 1984. B.A., California State; M.R.P., Pennsylvania
- MEYER, DELORES M., Program Coordinator, Continuing Education, 1985. B.A., Mt. St. Agnes
- MILLER, EDITH A., Associate Professor (EFLT), 1972, 1980. B.S., M.S., S. Miss.; Ed.D., Georgia
- MILLER, GARY L., Research Associate (Entomol.), 1983. B.A., Millersville; M.S., Tennessee
- MILLER, RALPH E., Associate Professor (Theatre), 1974, 1976. B.S., Kent State; M.A., Kansas STC; Ph.D., Wayne State
- MILLER, SHEILA A., Assistant Professor (Nursing), 1988. B.S., Alderson Broadd; M.S.N., W. Virginia
- MILLER, STARR C., Pharmacist (Sm. An. Surg. & Med.), B.S., Auburn
- MILLER, SUSIE L., Admin. Assistant, External Affairs/ATAC, 1975, 1988.
- MILLERS, ELIZABETH G., Instructor (Accountancy), 1988. B.S., M.A., Auburn
- MILLMAN, MARY M., Assistant Professor (Foreign Languages), 1968. A.B., Michigan; M.A., E. Michigan; M.A., NYU; Ed.D., Georgia
- MILLMAN, RICHARD G., Professor (Architecture), 1968. B.Arch., M.Arch., Michigan
- MILTON, JAMES L., Professor (S. An. Surg. & Med.), 1967, 1985. D.V.M., M.S., Auburn
- MINC, PIOTR, Associate Professor (Math-FAT), 1978, 1984. M.S., Ph.D., Warsaw
- MINYARD, DONALD H., Assistant Professor (Accountancy), 1987. B.S., M.B.A., Auburn; Ph.D., Illinois
- MITCHELL, DONNA, Assistant, Treasurer's Ofc., 1982. B.S., Auburn
- MITCHELL, DOROTHY N., Instructor (Art), 1960, 1975. B.A., Auburn
- MITCHELL, JAMES F., Manager, Personnel Svcs., 1987. B.S., Auburn; M.Div., New Orleans Baptist; D.Min., Luther Rice
- MITRA, AMITAVA, Associate Professor (Management), 1979, 1984. B.T., D.I.I.T., Indian Inst. Tech; M.S., Kentucky; Ph.D., Clemson
- MITREYSKI, GEORGE, Assistant Professor (Foreign Languages), 1983. M.A., Ph.D., Ohio State
- MIZE, JACQUELYN, Assistant Professor (Fam. & Child. Dev.), 1984. B.A., M.S., Georgia; Ph.D. Purdue
- MOHAN, RAJ P., Professor (Sociology), 1973, 1985. B.S., Agra-India; M.A., Maine; Ph.D., N. C. State
- MOL, HENDRICK D., Associate Professor (Build. Sci.), 1977, 1984. B.S.C.E., New Jersey Tech; M.S.C.E., Stanford
- MOLL, HAROLD DAVID, Resident (L. An. & Surg.), 1986. D.V.M., Kansas State

- MOLZ, FRED J.**, Feagin Professor (Civil Engr.), 1970, 1981. B.S., M.S.C.E., Drexel; Ph.D., Stanford
- MONCUS, DAVID L.**, Data Base Adm., Univ. Cmping., 1983, 1986. B.S., Auburn
- MONTGOMERY, MICHAEL R.**, Instructor (Economics), 1983. B.A., Fla. Southern; M.A., Florida
- MONTJOY, AMELIA L.**, Instructor (Religion), 1988. B.A., Mississippi; M.Div., Trinity Episcopalian
- MONTJOY, ROBERT S.**, Associate Professor, MPA Dir. & Act. Head (Pol. Sci.), 1979. B.A., Mississippi; M.A., Alabama; Ph.D., Indiana
- MOORE, CLAUDE H.**, Interim Assoc. Dir. & Professor Agr. Exp. Sta., 1956, 1959. B.S., Auburn; M.S., Kansas State; Ph.D., Purdue
- MOORE, JANE B.**, Professor (HHP), 1969, 1974. B.A., Judson; M.S., Tennessee; Ed.D., Alabama
- MOORE, LARRY J.**, Coordinator, Vet Med LRC, 1983. B.A., M.A., Auburn
- MOORE, MARION S.**, Ver. Public Service Specialist (Vet. Medicine), 1970, 1977. B.S., Auburn
- MOORE, M. NELLE**, Personnel Specialist, Student Financial Aid, 1976, 1980.
- MOORE, ROBERT P.**, Continuing Ed. Inst., Continuing Education, 1987. B.S., Samford
- MOORE, THOMAS C.**, Staff Physician, Drake S.H.C., 1983. B.S., Texas; M.D., SW Med. School
- MOORE, WAYNE T.**, Professor (Music), 1964, 1971. A.B., Elon; A.M., Ed.D., Columbia
- MOORE, WELLINGTON**, Professor & Director (Path. & Parasit.), 1978. B.S., Kentucky; D.V.M., Auburn; Ph.D., Cornell
- MOORES, DAVID L.**, Visiting Associate Professor (Communication Disorders), 1988. B.Sc., Ph.D., London
- MORA, E. C.**, Professor (Poultry Science), 1958, 1967. B.S., New Mexico; M.S., New Mexico St.; Ph.D., Kansas State
- MORACCO, JOHN C.**, Professor (Coun. & Coun. Psychol.), 1977, 1983. B.S., SUNY; M.A., Arizona State; Ph.D., Iowa
- MORAN, EDWIN T.**, Professor (Poultry Science), 1986. B.S., Rutgers; M.S., Ph.D., Washington
- MORAN, MICHAEL J.**, Assistant Professor (Comm. Dis.), 1983. B.S., E. Stroudsburg St.; M.A., Wichita St.; Ph.D., Penn State
- MOREMAN, MARK D.**, Office Manager (L. An. & Surg.), 1986. B.S., Auburn
- MORGAN, HORACE C., JR.**, Professor & Associate Dean, Acad. & Admin. Aff. (Vet. Med.), 1955, 1980. D.V.M., M.S., Auburn
- MORGAN, JOE M.**, Associate Professor (Civil Engr.), 1971, 1980. B.S., Tennessee Tech; M.S., Ph.D., Va. Tech
- MORGAN, JOHN S.**, Assistant Professor (Art), 1981. B.F.A., Memphis Ac. of Art; M.F.A., Syracuse
- MORGAN-JONES, GARETH**, Professor (Pl. Path.), 1973, 1979. B.Sc., D.Sc., Wales; Ph.D., Nottingham
- MORGAN, JULIA M.**, Associate Professor (Music), 1973, 1982. B.M., M.M., Alabama
- MORGAN, R. GILLIS**, Associate Professor (Journalism), 1977, 1984. B.A., M.A., Alabama
- MORGAN, THOMAS E.**, Professor (EFLT), 1968. B.S., Austin Peay; M.S., Ed.D., Tennessee
- MORRIS, DREWRY H. IV**, Associate Professor (Foreign Languages), 1971, 1981. A.B., Davidson; M.A., M.Phil., Yale; Ph.D., N. Carolina
- MORRIS, JOHN C.**, Research Associate, Ctr. for Governmental Svcs., 1988. B.A., M.A., Auburn
- MORROW, PATRICK D.**, Professor (English), 1975. A.B., USC; M.A., Ph.D., Washington
- MORSE, MICHAEL S.**, Assistant Professor (Elec. Engr.), 1987. B.S., M.S., Tulane; Ph.D., Clemson
- MOSSHOLDER, KEVIN W.**, Lower Professor (Management), 1978, 1983. B.A., Louisville; Ph.D., Tennessee
- MOSSHOLDER, SUSAN B.**, Specialist, Comm. on Aging (Nutrition and Foods), 1983, 1986. B.A., Louisville; M.S., Auburn
- MULLER, CHARLES J.**, University Architect, Facilities, 1989. B.S., E. Texas
- MUNCASTER, PATSY B.**, Cont. Ed. Coordinator, Continuing Education, 1988. B.S., Auburn
- MUNDAY, CHARLES W.**, Associate Professor (Art), 1977, 1984. B.F.A., Tennessee; M.F.A., SUNY—Buffalo
- MURPHY, JULIA H.**, Adjunct Instructor (Math-ACA), 1963, 1965. B.S., M.S., Auburn
- MUSSEWHITE, TROY C.**, Instructor (Mkt. & Transp.), 1985. B.S.B.A., Florida; L.L.B., Stetson
- MYERS, EMILY W.**, Instructor (Sociology), 1987. B.A., M.A., LSU
- MYERS, LAWRENCE J.**, Assistant Professor (Phys. & Pharma.), 1982. B.S., M.S., Ph.D., Oklahoma St.; D.V.M., Mississippi State
- MYKYTKA, EDWARD F.**, Assistant Professor (Ind. Engr.), 1982. B.S., Dayton; M.S., Iowa; Ph.D., Arizona
- MYRICK, PATRICIA L.**, Instructor (English), 1984. B.A., Southwestern-Memphis; M.A., Kentucky; Ph.D., Indiana
- MYSINGER, PAT W.**, Resident Intern (Lg. An. Surg. & Med.), 1987. B.S., Alabama; M.S., D.V.M., Auburn
- NADAR, THOMAS R.**, Assistant Professor (Foreign Language), 1987. B.A., Notre Dame; M.A., Ph.D., Michigan
- NAGLE, LUELLEN**, Engr. Pub. Svc. Spec., Engr. Ext. Svc., 1972. B.S., Auburn
- NAIR, MADATHINGAL G.**, Assistant Professor (Math-ACA), 1988. B.Sc., M.S., Calicut; Ph.D., Melbourne
- NAKHJAVAN, BEHZAD B.**, Visiting Assistant Professor (Architecture), 1988. B.Arch., Mississippi St.; M.Arch., Washington
- NATARAJAN, RAJAN**, Assistant Professor (Mktg. & Transp.), 1988. B.Tech., Indiana Inst. Tech; M.B.A., McGill; Ph.D., Drexel
- NEELY, W. C.**, Associate Professor (Chemistry), 1966, 1970. B.S., Miss. State; M.S., Ph.D., LSU
- NIEBUHR, ROBERT E.**, Associate Professor & Head (Management), 1977, 1983. B.S., Cincinnati; M.S., Ph.D., Ohio State
- NEILSON, JAMES J.**, Instructor (English), 1984. B.A., Cincinnati; M.A., Miami-Florida
- NELMS, ROBERT M.**, Assistant Professor (Elec. Engr.), 1984, 1987. B.E.E., M.S., Auburn; Ph.D., VPI
- NELSON, BARBARA**, Librarian II (Library), 1978. B.A., Central Michigan; M.A., Michigan State; M.L.S., Michigan
- NELSON, DANIEL J.**, Professor (Polit. Sci.), 1969, 1976. B.A., Wheaton; M.A., Michigan; Ph.D., Columbia
- NELSON, MICHAEL B.**, Librarian II, Library, 1986. B.A., St. Olaf; M.A., Colorado State; M.A., Notre Dame; M.L.S., Indiana
- NELSON, VICTOR P.**, Associate Professor (Elec. Engr.), 1978, 1982. B.S.E.E., Kentucky; M.S., Ph.D., Ohio
- NEUMAN, RONALD D.**, Professor (Chem. Engr.), 1984. B.S., Washington; M.S., Ph.D., Inst. of Paper Chemistry
- NEVIN, CHARLES W.**, Police Captain, AUPD, 1980, 1984.
- NEWHOUSE, ELIZABETH I.**, Postdoctoral Fellow, Space Power Institute, 1988, 1989. B.S., M.S., Michigan State; Ph.D., Michigan
- NEWKIRK, SANDRA**, Assistant Professor (HHP), 1966, 1972. B.S., Purdue; M.S., M.S., Indiana
- NEWLAND, M. CHRISTOPHER**, Assistant Professor (Psychology), 1988. B.E.E., Auburn; M.S., Ph.D., Georgia Tech
- NEWMAN, VICTORIA T.**, Financial Aid Counselor, Student Financial Aid, 1988. B.S., M.Ed., Auburn
- NEWTON, DAVID S.**, Associate Professor (Pharmacy), 1974. B.B.A., B.S., M.B.A., Ph.D., Mississippi

- NICHOLS, JAMES O., Associate Professor (Aerosp. Engr.), 1960, 1970. B.S.A.E., M.S.E., Ph.D., Alabama
- NICHOLS, THOMAS R., Training Counselor, Athletic Department, 1986. B.A., Livingston; M.A., North Alabama
- NICOL, LIZABETH B., Library Auto. Mgr. (Library), 1984. B.S., Auburn
- NIEBUHR, ROBERT E., Associate Professor & Head (Management), 1977, 1983. B.S., Cincinnati; M.S., Ph.D., Ohio State
- NIELSEN, BRENT L., Assistant Professor (Botany-Microbiology), 1988. B.S., Brigham Young; Ph.D., Oregon State
- NIST, JOAN S., Associate Professor (EFLT), 1971, 1983. A.B., Lawrence; M.A., Indiana; Ed.D., Auburn
- NIX, BEVERLEE E., Intern (Sm. An. Surg. & Med.), 1988. B.S., B.S., D.V.M., Texas A&M
- NIX, PATRICIA H., Instructor (Curriculum & Teaching), 1989. A.B., Sanford; M.A.E., UAB
- NOH, SEUNG J., Research Specialist, Temp. Office Svcs., 1983, 1989. B.S., M.S., Seoul National; Ph.D., Auburn
- NOLAND, RONALD G., Associate Professor (Curr. & Teach.), 1969, 1974. B.S., M.Ed., LSU; Ed.D., Sou. Miss.
- NORRIS, DWIGHT R., Associate Professor (Management), 1977, 1983. B.S., Valdosta State; M.B.A., Ph.D., Georgia
- NORTON, JOSEPH D., Professor (Horticulture), 1954, 1973. B.S., M.S., Auburn; Ph.D., LSU
- NUNNALLY, THOMAS, Assistant Professor (English), Director, Writing Ctr., 1984, 1986. B.A., Alabama; M.A., Ph.D., Georgia
- NUNNELLY, SUSAN C., Coordinator, Rec. Services, 1973, 1984. B.S., M.Ed., Auburn
- NUSBAUM, KENNETH E., Assistant Professor (Pathobiol.), 1982. B.S., D.V.M., Cornell; M.S., Ph.D., Georgia
- NYAMEKYE, KOFI, Assistant Professor (Ind. Engr.), B.S., Wisconsin; M.S., Ph.D., Penn. State
- O'BRIEN, JAMES F., JR., Director, Engr. Ext. Svc., 1957, 1983. B.M.E., M.M.E., Auburn
- O'BRIEN, JOANIE, Women's Asst. Basketball Coach, Athletic Dept., 1988. B.S., Penn St.; M.S., Auburn
- O'BRIEN, TERRANCE P., Assistant Professor (VAE), 1985. B.S., M.S., Old Dominion; Ph.D., Ohio State
- ODOM, ROY W., Sys. Suppt. Spec. III, Tech Suppt., 1984. B.S., M.A.C.T., Auburn
- OLDHAM, JOHN D., Assistant Professor (Art), 1986. B.F.A., Oklahoma; M.Ed., Central-Oklahoma
- OLDS, S. JEAN, Assistant Professor (Fam. & Child Dev.), 1987. B.S., M.S., E. Kentucky; Ph.D., Tennessee
- OLIVER, JULIAN L., Instructor (Path. & Parasit.), 1982. B.S., Maryland; D.V.M., Georgia
- OLLIFF, DONATHON C., Associate Professor (History), 1970, 1981. B.A., M.A., Auburn; Ph.D., Florida
- OLSON, DOUGLAS J., Professor (Art), 1968, 1983. B.F.A., Layton Art; M.F.A., Cincinnati
- ORGEN, AHMET T., Assistant Professor (Architecture), 1981. B.Arch., Istanbul; M.Arch., Virginia; Ph.D., Rensselaer
- OSWALD, SHARON L., Instructor (Management), 1987. B.A., Auburn; M.B.A., Alabama-Birmingham
- O'TOOLE, LAURENCE J., JR., Alumni Professor (Pol. Sci.), 1979, 1986. B.S., Clarkson; M.P.A., Ph.D., Syracuse
- OVERSTREET, ROBERT L., Associate Professor (Speech Comm.), 1970, 1974. A.B., N. Georgia; M.A., Northwestern; Ph.D., LSU
- OWEN, BEVERLY R., TV Art Designer, ETV, 1985
- OWEN, JAMES L., Mgr., Minicmpt. Suppt., Univ. Cmping., 1983, 1984. B.S., UAB
- OWENS, MELVIN, Police Captain, AUPD, 1981, 1988.
- OWSLEY, FRANK L., JR., Professor (History), 1960, 1971. B.A., Vanderbilt; M.A., Ph.D., Alabama
- PABLO, LUISITO S., Resident (Lg. An. Sur. & Med.), 1987. D.V.M., Philippines; M.S., Auburn
- PADGETT, MARY L., Research Associate (Aerosp. Engr.), 1987, 1988. M.S., M.S., Auburn
- PADGETT, STEVEN B., Assistant Professor (Speech Comm.), 1985. B.S., Central Fla.; M.A., Alabama
- PADGETT, WILLIAM T., Director, Coop. Ed., 1967, 1984. B.S.E.E., M.S., Auburn
- PAGE, DANIEL E., Associate Professor (Finance), 1984. B.S., B.A., M.B.A., Appalachian State; Ph.D., Georgia
- PAINTER, JOHN D., Assistant Sports Info. Dir., Athletic Dept., 1988. B.A., Tennessee
- PANANGALA, VICTOR S., Associate Professor (Pathobiol.), 1980, 1986. D.V.M., E. Pakistan Ag. U.; M.Sc., Guelph; Ontario; Ph.D., Cornell
- PANCAKE, CHERRI M., Visiting Assistant Professor (Cmpt. Sc. & Engr.), 1984. B.S., Cornell; Ph.D., Auburn
- PANCAKE, DALE C., Asst. Mgr. (Forestry), 1984. B.S., LSU; M.S., Auburn
- PARISH, EDWARD J., Assistant Professor (Chemistry), 1981. B.S., SW Texas; M.A., Sam Houston; Ph.D., Miss. State
- PARRISH, SARAWANEE, Research Associate (Botany-Microbiology), 1988. B.S., Kasetsart; M.S., Chulalongkorn; Ph.D., Auburn
- PARK, CHAN S., Associate Professor (Ind. Engr.), 1980, 1982. B.S., Hanyang; M.S.I.E., Purdue; Ph.D., Ga. Tech
- PARK, SUNG-WON, Assistant Professor (Elec. Engr.), 1985. B.E., Hanyang; M.S.E.E., Ph.D., Nex Mexico
- PARKER, EMERY, Instructor (Accountancy), 1986. B.B.A., M.B.A., Delta State
- PARKER, FRAZIER, JR., Associate Professor (Civil Engr.), 1981, 1985. B.S., C.E., Alabama, M.S.C.E., Ph.D., Texas
- PARKER, KEITH D., Assistant Professor (Sociology), 1987. B.A., Delta State; M.A., Ph.D., Miss. State
- PARKER, RAY K., Dean & Professor (Architecture), 1988. B.Arch., Auburn; B.A., Arizona State; M.A., Rice
- PARKER, STEPHANIE A., Health Educator, Student Health Ctr., 1988. R.N., Providence; B.S., Spring Hill; M.Ed., Central Arkansas
- PARKS, JOHN D., Assistant Track Coach, Athletic Dept., B.S., Auburn
- PARKS, PAUL F., Vice President for Research & Professor (An. Dairy Sci.), 1965, 1981. B.S., M.S., Auburn; Ph.D., Texas A&M
- PARROTT, DONALD J., Cont. Ed. Specialist, Continuing Ed., 1985; B.A., Alliance; M.A., Alabama
- PARSONS, DANIEL L., Associate Professor (Pharm. Sc.), 1982. B.S., Ph.D., Georgia
- PATE, THOMAS H., Associate Professor (Math-ACA), 1978. B.S., Georgia State; Ph.D., Emory
- PATTERSON, GORDON, Assistant Professor (Voc. & Adult Ed.), 1971. B.S., M.Ed., Auburn; Ph.D., Maryland
- PATTERSON, MICHAEL G., Assistant Professor (Agron. & Soils), 1980, 1985. B.S., M.S., Ph.D., Auburn
- PATTERSON, TAMARIA H., Financial Info. System Assistant, FIS, 1974, 1985. B.S., M.Ed., Auburn
- PEARSON, ROBERT E., Associate Professor (Pharmacy), 1978, 1983. B.S., M.S., Illinois
- PECHMAN, LINDA S., Auditor I, Internal Auditing, 1983. B.S., Auburn
- PEEL, ELIZABETH E., Conference Facilitator, Conference Center, 1984, 1988. B.S., M.Ed., Auburn
- PELLIKA, PAUL E., Instructor (English), 1988. B.A., California; M.A., Texas
- PENASKOVIC, RICHARD, Professor & Head (Religion), 1984. B.A., St. Hyacinth; M.A., Wuerzburg; Ph.D., Munich

- PENDERGAST, PATRICK F., Assistant Professor (Polit. Sci.), 1970, 1974. B.S., John Jay Col.; M.P.S., Auburn
- PENDERGRASS, JAN N., Assistant Professor (Mech. Engr.), 1987. M.A., Ludwig-Maximilians; Ph.D., Tours
- PENROD, DARRELL D., Professor (Mech. Engr.), 1978. B.S., Northwestern; M.A., Washington State; Ph.D., Illinois
- PEOPLE, JOE E., Assistant Director, Food Svc. Admin., 1981, 1982. B.A., Columbus; M.A., Troy State
- PEREZ, JOE D., Professor & Head (Physics), 1988. B.S., Loyola; Ph.D., Maryland
- PERKINS, WARREN S., Alumni Professor & Head (Textile Engr.), 1968, 1982. B.S., Clemson
- PERRICONE, CATHERINE R., Professor (For. Languages), 1972, 1982. B.A., Notre Dame; M.A., Oklahoma; Ph.D., Tulane
- PERRY, CLIFTON B., Associate Professor (Philosophy), 1984. B.A., Long Beach; M.A., Ph.D., Cal-Berkeley
- PERRY, KERMIT S., Assistant Athletic Director, O & F, Athletic Dept., 1981. B.S., Georgia; M.Ed., Peabody
- PERRY, LONNIE A., Resident (S. An. Sur. & Med.), 1987. B.S., D.V.M., Missouri
- PERRY, WILLIAM D., Associate Professor (Chemistry), 1971, 1978. B.S., FSU; Ph.D., Illinois
- PHELPS, KEVIN T., Professor (Math-ACA), 1987. B.A., Brown; M.S., Ph.D., Auburn
- PHELPS, RONALD P., Associate Professor (Fish. & Allied Aquac.), 1975, 1982. B.S., Ph.D., Auburn
- PHILLIPS, ERNEST A., Assistant Treasurer, Business Office, 1964, 1973. B.S., Auburn
- PHILLIPS, THOMAS, Associate Professor (Cmpt. Sc., Engr.), 1974, 1981. B.S., M.S., Mississippi; Ph.D., Oklahoma
- PICKERELL, JACK E., Operations Analyst, Facilities, 1986. B.S., Butler
- PICKERING, WILLIAM A., Assistant Professor (Pol. Sci.), 1967, 1968. A.B., M.A., Emory; Ph.D., Alabama
- PICKETT, GUYQUINE L., Assistant Professor (Music), 1988. B.A., W. Virginia; M.M., Yale; D.M.A., Wisconsin
- PIDGEON, JACULI L., Associate Professor (S. An. Surg. and Med.), 1978, 1983. B.S., D.V.M., Colorado State
- PIDGEON, RHODA S., Medical Illustrator (Vet. Medicine), 1973, 1977. B.F.A., Va. Commonwealth
- PIERCE, DOROTHY H., Assistant Professor (Chemistry), 1985. B.A., Bryn Mawr; M.S., Ph.D., Pennsylvania
- PIFER, DAVID F., Director, Contracts & Grants (VP Research Off.), 1974, 1983. B.S., Auburn
- PIGGOTT, GAIL B., Instructor (Marketing & Transportation), 1988. B.S., M.Ed., AUM
- PIKE, CATHY K., Instructor (Sociology), 1988. B.A., Auburn; M.S.W., Alabama
- PINDZOLA, MICHAEL S., Professor (Physics), 1978, 1982. B.A., U. of the South; Ph.D., Virginia
- PINDZOLA, REBEKAH H., Associate Professor (Comm. Dis.), 1979. B.S., M.S., E. Carolina; Ph.D., Tennessee
- PIPES, RANDOLPH B., Associate Professor (Coun. Ed.), 1977, 1983. B.S., SE. Oklahoma State; Ph.D., Texas
- PITTS, CHARLOTTE A., Assistant Professor (Nursing), 1986. B.S.N., UAB; M.S.N., Med. Col. of Georgia; Ed.D., Auburn
- PITTS, DELORES P., Specialist, VP-Student Affairs, 1987. B.S., Auburn
- PLACE, PAUL C., Director (Nutrit. & Foods), 1983, 1988. B.S., Columbus
- PLACEK, TIMOTHY D., Assistant Professor (Chem. Engr.), 1978. B.S., M.S., Cleveland State; Ph.D., Kentucky
- PLASKETES, GEORGE M., Assistant Professor (Speech Comm.), 1985. B.A., M.A., Mississippi; Ph.D., Bowling Green
- PLASTER, MARCIA B., Ext. Prog. Associate, ADM-Education, 1987. B.A., Auburn; M.Ed., Troy State
- PONDER, HARRY G., Professor (Horticulture), 1978, 1985. B.S., M.S., Auburn; Ph.D., Michigan State
- POPE, OLIVIA H., Contract Specialist (Off. of VP for Research), 1981, 1985. B.S., Troy State
- POPE, RICHARD C., Administrative Project Mgr., Admin. Cmptng. Svc., 1976, 1981. A.B., Grinnell; M.B.A., Sou. Illinois
- POPPLE, PHILLIP R., Associate Professor & Director (Sociology), 1982
- POTTER, MARY A., Assistant Professor (Cons. Aff.), 1969, 1978. B.S., Georgia Southern; M.H.E., Georgia; Ed.D., Auburn
- POUND, CAROLYN, Student Loan Manager, Bursar and Cashiers Department, 1978. B.S., Auburn
- POWE, THOMAS A., JR., Associate Professor (L. An. Surg. and Med.), 1972, 1984. D.V.M., Auburn; M.S., Tuskegee
- POWELL, W. DEE, Associate Director II, Alumni Office, 1985. B.S., Texas A&M
- POWERS, ROBERT D., Professor (Pathobiol.), 1969, 1978. B.S., Tennessee; D.V.M., Auburn; Ph.D., Tenn. Med. Units
- PRATHER, MARY H., Personnel Specialist, Personnel Svcs., 1986. B.S., Auburn; M.S., Troy State
- PRATHER, MELISSA H., Accountant, Financial Reporting, 1988. B.S., Troy State
- PRICE, CHARLES E., Assistant Professor (Accountancy), 1987. B.A., M.B.A., Auburn; Ph.D., Georgia
- PRICE, MARK S., Associate Professor (Art), 1976, 1983. B.F.A., M.F.A., Illinois
- PRITCHETT, JOHN F., Professor & Head (Zoo-Wildlife Sc.), 1973, 1983. B.S., M.S., Auburn; Ph.D., Iowa State
- PROBST, LLOYD J., Manager, AU Aviation, 1988. B.S., Air Force; M.S., Texas A&M
- PUGH, JOHN R., Professor (HHP), 1966, 1981. B.S., E. Tenn. State; M.S., Ed.D., Tennessee
- PUCKETT, LAUREN L., Accountant, Contracts & Grants, 1988. B.S., Auburn
- PUGH, WILLIAM G., Assistant Professor (Finance), 1986. B.S., Auburn; M.S., Ph.D., FSU
- PUROHIT, RAM C., Professor (L. An. Surg. and Med.), 1973, 1983. B.V.Sc., & A.H., Rajasthan; M.S., Tuskegee; Ph.D., Auburn
- PUTNAM, MARSHALL R., Assistant Professor (L. An. Surg. & Med.), 1983. D.V.M., Auburn; M.S., Okla. State
- PYLAND, KENNETH D., Coordinator, Alumni & Dev. Info. Sys., 1974, 1979. B.S., M.B.A., Auburn
- QI, GUI-MING, Visiting Scholar (Civil Engr.), 1988. B.S., M.S., Shandong
- QUINN, LUKE P., Supervisor IV, University Printing Svc., 1969, 1983
- RAGAN, ELIZABETH A., Instructor (Art), 1985. B.A., Birmingham-Southern; M.F.A., Pratt
- RAHMAN, MAHMUD A., Research Associate (Chem. Engr.), 1984, 1986. B.S., Bangladesh U. of Engr. & Tech.; M.S., Ph.D., Oklahoma State
- RAINER, REX K., Instructor (Management), 1988. B.S., Auburn; D.M.D., U.A.B.
- RAJESHUNI, SARALA, Postdoctoral Fellow (Chemistry), 1988. B.Sc., M.Sc., Ph.D., Osmania
- RAJU, POLAPRAGADA K., Associate Professor (Mech. Engr.), 1984. B.E., S.V.-India; M.Sc., Ph.D., IIT-Madras-India
- RAMEY, CATHERINE F., Assistant Manager, Union Bldg. Operations, 1985, 1987. B.A., Auburn
- RAMEY, G. E., Professor & Head (Civil Engr.), 1965, 1984. B.S.C.E., M.S.C.E., Auburn; Ph.D., Colorado
- RAO, SADASIVA M., Associate Professor (Elec. Engr.), 1988. B.E., Osmania; M.S., Indian Inst. of Science; Ph.D., Mississippi
- RAPER, CHARLES F., Professor (Forest Management), 1988. B.S., N.C. State; M.B.A., J.D., Connecticut
- RAVIS, WILLIAM R., Professor (Pharm. Sci.), 1977. B.S., Temple; Ph.D., Houston
- RAY, CHARLES H., Director, Safety & Environ. Health, 1982, 1986. B.S., FSU; M.S., Ph.D., Auburn

- REA, ROBERT R., Professor (History), 1950, 1961. A.B., Friends University; M.A., Ph.D., Indiana
- REED, MORTON W., Associate Professor (Textile Engr.), 1985. B.S., Tenn. Tech; Ph.D., Vanderbilt
- REEDER, CHARLES F., Director, Admissions, 1976, 1981. B.S., M.Ed., Mid. Tenn.; Ed. D., Auburn
- REESE, BETTY, Engr. Accountant, Engr. Station, 1973, 1979. B.S., Alabama A&M
- REEVE, T. GILMOUR, Professor (HHP), 1977, 1982. B.S., M.Ed., Texas Tech; Ph.D., Texas A&M
- REGIER, GAIL T., Instructor (English), 1988. B.S., Sou. West. Missouri State; M.F.A., Arkansas
- REGISTER, JOEL D., Instructor (English), 1986. M.A., B.A., SW Louisiana
- REID, GWENDOLYN F., Assistant Alumni Director, 1983, 1986. B.A. Ohio; B.S., M.S., Auburn
- REID, R. KENT, Int'l Devel. Fellow (Forestry), 1988. B.S., N. Carolina State; M.S., Colorado; Ph.D., Clemson
- REINKE, CARL M., Assistant Professor (Clin. Pharm. Prac.), 1985. B.A., Jamestown; B.S., M.S., Pharm.D., Michigan
- RENFROE, STEVEN W., Assistant Baseball Coach, Athletic Dept., 1982. B.S., Auburn
- RESSLER, RALPH, Exec. Director, State Council on Voc. Ed., 1978. B.A., M.A., Montclair; Ph.D., Ohio State
- REYNOLDS, ANNA R., Med. Tech. & Instructor (Chemistry), 1982, 1983. B.S., Med. College of Virginia
- REYNOLDS, GEORGE W., Asst. Dir. (Coop. Ed.), 1981, 1984. B.S., M.Ed., Auburn
- REYNOLDS, TED M., Assistant Professor (Anat. & Histol.), 1966, 1972. D.V.M., M.S., Auburn
- RICE, DALE R., Associate Professor (Curr. & Teach.), 1986. B.S., M.Ed., Penn. State; Ph.D., Ohio State
- RICHARDS, MARY P., Dean & Professor (Liberal Arts), 1988. B.A., SMU; M.A., Ph.D., Wisconsin
- RICHARDSON, DON R., Acting Head & Professor (Speech Comm.), 1966, 1986. B.S., Auburn; M.A., Ph.D., Ohio
- RICHARDSON, JANET D., Coord. of Instt. Studies, Planning & Analysis, 1979, 1983. B.A., M.A., Auburn
- RICHARDSON, LAURA L., Assistant Manager, Food Services, 1988. M.A., Auburn
- RICHARDSON, ROBERT S., Associate Professor (Music), 1975, 1982. B.S., M.Ed., Auburn
- RIDDELL, KAY P., Research Associate, Vet. Med. Admin., 1984. D.V.M., Auburn
- RIDDELL, M. GATZ, JR., Assistant Professor (L. An. Surg. & Med.), 1984. B.S., D.V.M., Kansas State; M.S., Auburn
- RIDGEWAY, LARRY D., Director, Student Financial Aid, 1977. B.S., M.A., S. Alabama
- RIDGWAY, JAMES W., Art Designer, Engr. Admin., 1979. B.F.A., Auburn
- RIGGS, LLOYD S., Assistant Professor (Elec. Engr.), 1985. B.S., M.S., Ph.D., Auburn
- RILEY, RHETT E., Vice President for Business & Finance, 1963, 1985. B.S., Auburn
- RILEY, THOMAS N., Acting Dean & Professor (Phar. Sc.), 1982. B.S., Kentucky; Ph.D., Minnesota
- RITTENBAUGH, ROBERT C., Director, Univ. Bookstore, 1987. B.A., M.B.A., Penn. State
- RITTER, MARK A., Assistant Professor (Foreign Language), 1988. B.A., Cornell; Ph.D., Texas
- ROBERSON, SUSAN L., Instructor (English), B.A., Baylor; M.A., Ph.D., Texas A&M
- ROBERTS, F. L., Professor (Civil Engr.), Director, NCAT, 1986. B.S. M.S., Arkansas; Ph.D., Texas
- ROBERTSON, B. T., Professor (Physio. & Pharma.), 1960, 1982. B.S., Kentucky; D.V.M., M.S., Auburn
- ROBERTSON, SUSAN A., Assistant Director, Personnel Svcs., 1988. B.A., San Francisco; M.B.A., Notre Dame
- ROBERTSON, WILLIAM, Construction Engr., Technical Svcs., 1988. B.S., Tuskegee
- ROBINSON, ANITA H., Asst. Fin. Mgr., Bookstore, 1985. B.S., Old Dominion
- ROBINSON, CECIL E., Associate Professor (Math-ACA), 1962, 1965. B.S., Auburn; M.A., Ph.D., Alabama
- ROBINSON, DYANN, Instructor (Theatre), 1987. B.A., Butler; M.A., Catholic
- ROBINSON, JACQUELYN P., Assistant Professor (Voc. & Adult Ed.), 1988. B.S., Montevallo; M.Ed., Livingston; Ed.D., Alabama
- ROBINSON, PETER A., Ind. Hygienist, Envir. Hlth., 1987. B.S., W. Florida
- ROBISON, LLOYD E., Associate Professor (EFLT), 1968, 1984. B.S., M.S., Ed.D., Auburn
- RODEN, REBECCA H., Assistant to the Dean, Graduate School, 1956, 1973. B.S., Auburn
- RODGER, CHRISTOPHER A., Associate Professor (Math-ACA), 1982, 1986. B.Sc., M.Sc., Sydney; Ph.D., Reading-England
- RODRIGUEZ, NELLY M., Post Doctoral Fellow (Chem. Engr.), 1986. B.Sc., Universidad Nacional de Colombia; Ph.D., Newcastle upon Tyne
- ROGERS, ANDREA A., Assistant Trainer, Athletic Dept., 1987. B.S., Tennessee; M.S., Old Dominion
- ROGERS, CHARLES L., Associate Professor (Elec. Engr.), 1961, 1969. B.E.E., M.S., Auburn; Ph.D., Duke
- ROGERS, JACK W., JR., Professor (Math-FAT), 1973, 1976. B.A., M.A., Ph.D., Texas
- ROGERS, JANET S., Instructor (Math-FAT), 1983, 1988. B.A., Texas; M.A., Auburn
- ROOS, C. WILLIAM, Associate Professor (Chem. Engr.), 1983. B.S., M.S., D.Sc., Washington
- ROPPEL, THADDEUS A., Assistant Professor (Elec. Engr.), 1986. B.S., M.S., Ph.D., Mich. State
- ROSE, CHARLES S., JR., Associate Professor (English), 1960, 1969. A.B., Vanderbilt; M.A., Ph.D., Florida
- ROSE, M. FRANK, Director, Space Power Inst., Professor (Elec. Engr.), 1985. B.S., Virginia; M.S., Ph.D., Penn. State
- ROSEN, MELVIN, Track Coach and Assistant Professor (HHP), 1955, 1963. B.S., M.A., Iowa
- ROSENBAUM, LAWRENCE, Professor (Music), 1961, 1966. B.M., Arizona; M.M., Arkansas
- ROSENBLATT, DAVID J., Asst. Archivist & Adj. Asst. Professor, Archives, 1976, 1984. B.A., M.A., Missouri
- ROSENFARB, IRWIN, Assistant Professor (Psychology), 1986. B.A., SUNY-Stonybrook; M.A., Ph.D., UNC-Greensboro
- ROSS, CONRAD H., Professor (Art), 1963, 1983. B.F.A., Illinois; M.F.A., Iowa
- ROSS, JULIA CAROL, Women's Ass. Basketball Coach, Athletic Dept., 1984. B.S., Mississippi
- ROTFELD, HERBERT J., Associate Professor (Marketing & Transportation), 1988. B.S., M.S., Ph.D., Illinois
- ROTHSCHILD, JOYCE, Assistant Professor (English), 1981, 1983. B.A., Rutgers; M.A., Ph.D., Maryland
- ROUSE, DAVID B., Assistant Professor (Fish. & Allied Aquac.), 1981. B.S., M.S., Auburn; Ph.D., Texas A&M
- ROUSE, ROBERT W., Director & Professor (Accountancy), 1987. B.A., Furman; M.B.A., Emory; Ph.D., S. Carolina
- ROWSEY, ROBERT E., Associate Professor (Curr. & Teach.), 1973, 1980. A.B., M.S., Marshall; Ed.D., Auburn
- ROYAL, DONALD T., Director, Internal Auditing, 1973. B.S., Auburn
- ROYSTER, BARBARA H., Systems Analyst II, Admin. Cmpntg. Svc., 1981, 1983. B.A., Auburn
- RUCINSKI, TERRANCE T., Assistant Professor (EFLT), 1988. B.S., S.E. Missouri St.; M.S., N.E. Missouri St.; Ph.D., Illinois
- RUFF-PERRY, LISA, Research Specialist, Alumni, 1988. B.S., Miami

- RUMPH, PAUL F., Associate Professor (Anat. & Histol.), 1971, 1981. D.V.M., M.S., Auburn
- RUSSELL, LAVERN, Counselor, Student Dev. Svc., 1982. B.A., Florida; M.Ed., Ph.D., Georgia
- RYGIEL, DENNIS, Professor (English), 1972, 1984. B.A., M.A., Loyola; Ph.D., Cornell
- SABA, RICHARD P., Assistant Professor (Economics), 1974. B.A., M.B.A., Dallas; Ph.D., Texas A&M
- SADLER, CYNTHIA E., Instructor (Marketing & Transportation), 1988. B.S., N.W. Missouri State; M.B.A., Missouri
- SALINGER, STEPHEN F., Instructor (Psychology), 1988. B.S., Florida State; M.A., M.S., Auburn
- SALPAS, PETER A., Assistant Professor (Geology), 1986. A.B., Calif.-Riverside; Ph.D., Washington-St. Louis
- SALTS, CONNIE J., Associate Professor (Fam. & Child Dev.), 1985. B.S., Ohio State; M.A., Kent State; Ph.D., FSU
- SAMFORD, THOMAS D., General Counsel, Office of the President, 1988. A.B., Princeton; J.D., Alabama
- SAMPSON, GARY M., Associate Professor (Math-FAT), 1986. B.A., M.A., Temple; Ph.D., Syracuse
- SANDERS, TALMADGE, Supervisor IV (Veterinary Medicine), 1982, 1986
- SANDERS, THOMAS R., Librarian III (Library), 1983. B.A., Ohio Wesleyan; M.A., Harvard; M.L.S., Simmons
- SANDERSON, KENNETH C., Professor (Horticulture), 1966, 1977. B.S., Cornell; M.S., Ph.D., Maryland
- SANFORD, MARILYN, Asst. Dir., Bus. Svc. & Purch., 1969, 1985. A.A., Alex City JC
- SARATHY, PARTHA K., Manager, NMR (Chemistry), 1984. B.S., M.S., Ph.D., Madras-India
- SARTIN, EVA A., Resident (Pathobiol.), 1982. B.S., M.S., D.V.M., Oklahoma State
- SARTIN, JAMES L., Associate Professor (Physiol. & Pharma.), 1982. B.S., M.S., Auburn; Ph.D., Oklahoma State
- SAUSER, WILLIAM I., JR., Associate Vice President for Extension, 1977, 1988. B.S., M.S., Ph.D., Georgia Tech
- SAVRDA, CHARLES E., Assistant Professor (Geology), 1986. B.A., Rutgers; M.S., Ph.D., USC
- SCANLON, MATTHEW J., Assistant Professor (Chemistry), 1988. B.A., St. Vincent; Ph.D., Montana State
- SCBBA, J. BOYD, Associate Dean for Ext. & Pub. Svc. (Education), Associate Professor & Acting Head (EFLT), 1970, 1985. B.S., M.A., Austin Peay; Ed.D., Auburn
- SCHAEFFER, ROBERT W., Professor (Psychology), 1971. A.B., Franklin & Marshall M.S., Ph.D., Missouri
- SCHAEER, BARBARA B., Instructor (Ind. Engr.), 1983. B.I.D., M.Ed., Ed.D., Auburn
- SCHAEER, WALTER A., Professor (Industrial Design), 1960, 1965. B.A.A., Tech. Inst. of Berne; B.I.D., M.I.D., Ulm Grad. School of Design; Ph.D., Walden
- SCHILLINGS, FAY B., Assistant Professor (Curr. & Teach.), 1988. B.S., M.S., Auburn; Ed.D., Montana State
- SCHMIDT, PAUL D., Assistant Professor (Math-FAT), 1988. B.S., M.S., Ph.D., Technical Univ.-Aachen
- SCHMITZ, CECILIA, Librarian II, Library, 1988. B.A., M.L.S., Arizona
- SCHOFIELD, DOROTHY D., Assistant Professor (Theatre), 1988. C.M.A., Laban Inst.; M.A., M.A.E., Arizona State
- SCHULZ, RAINER, Associate Professor (Math-ACA), 1987. Diploma, Ph.D., Munich
- SCHUMACHER, JOHN, Assistant Professor (Ig. An. Sur. & Med.), 1982. B.S., D.V.M., Kansas State; M.S., Texas A&M
- SCHUMACHER, SHERI L., Assistant Professor (Arch.), 1986. B.A., Auburn; M.F.A., Cranbrook Ac. of Art
- SHOGAN, TESS C., Instructor (English), 1987. B.A., M.A., Mississippi; M.F.A., Arkansas
- SCOTT, BETTIE A., Library Associate, Library, 1987. B.A., Columbia
- SEAY, DON S., Construction Engineer, Physical Plant, 1979. B.S.E.E., Auburn
- SEAY, MICHAEL R., Instructor (Management), 1987. B.S., M.S., Auburn
- SELLERS, JAMES L., Asst. to the Dir., Engr., Ext. Svc., 1984. B.S., Auburn
- SELMAN, JAMES W., Coordinator, Ext. & Pub. Svc. (Voc. and Adult Ed.), 1983. B.S., M.S., Ed.D., FSU
- SERSLAND, DANIEL R., Assistant Professor (Mkt. & Transp.), 1987. B.A., Luther; M.B.A., Iowa St.; Ph.D., Penn State
- SHANDS, WAYLAND A., JR., Assistant Professor (Bot. & Microb.), 1963. B.S., Maine; M.S., Delaware
- SHAW, DEBORAH L., Coordinator of Student Organizations, 1983, 1985. B.S., N. Alabama; M.Ed., Auburn
- SHAW, JERRY L., Assistant Trainer, Athletic Department, 1988. B.S., M.S., Auburn
- SHAW, JOE J., Assistant Professor (Botany-Microbiology), 1988. B.A., California-Santa Barbara; Ph.D., California-Davis
- SHAW, WILLIAM L., Assistant Chief Engr., Telecom. & ETV, 1984, 1989. B.A., Auburn
- SHAW, WINFRED A., Professor (Engr. Admin.), 1958. B.S.G.E., Mississippi; M.S.E.M., Texas; Ph.D., Stanford
- SHEALY, PAUL M., Resident (Sm. An. Surg. & Med.), 1988. B.S., Clemson; M.S., D.V.M., LSU
- SHEBLE, GERALD B., Associate Professor (Elec. Engr.), 1986. B.S.E.E., M.S.E.E., Purdue; Ph.D., Va. Tech
- SHELTON, ALLEN C., Instructor (Sociology), 1987. B.A., Alabama; M.A., Jacksonville State; Ph.D., Georgia
- SHEVLIN, PHILIP B., Professor (Chemistry), 1970, 1979. B.S., Lafayette; M.S., Ph.D., Yale
- SHIELDS, ALAN J., Associate Professor (Socio. & Anthropol.), 1956, 1963. B.A., M.A., N. Texas State
- SHIH, WENG-KENG, Research Associate (Mech. Engr.), 1988. B.S., Tunghai; M.S., Ph.D., Washington University
- SHOEMAKER, W. LEE, Assistant Professor (Civil Engr.), 1983. B.S.E., Ph.D., Duke; M.E., Tulane
- SHORT, PAULA M., Assistant Professor (EFLT), 1987. A.B., M.Ed., Ed.D., N. Carolina
- SHUMPERT, THOMAS H., Professor (Elec. Engr.), 1974, 1982. B.S.E.E., M.S.E.E., Ph.D., Miss. State
- SIGNER, DENNIS A., Associate Professor (Mech. Engr.), 1966, 1984. B.S., M.S., Sc.D., Tech. U. of Istanbul; Ph.D., Minnesota
- SILVERN, LINDA, Instructor (Fam. & Child Devel.), 1987. B.A., Maryland; M.Ed., Auburn
- SILVERN, STEVEN B., Associate Professor (Curr. & Teach.), 1978, 1982. B.S., M.Ed., Maryland; Ph.D., Wisconsin
- SIMMS, JOHN D., Professor & Head (Journalism), 1974. B.S., Auburn; M.A., LSU
- SIMON, MARLLIN, Associate Professor (Physics), 1972, 1980. B.A., M.S., Kansas STC; M.S., Michigan St.; Ph.D., Missouri
- SIMONTON, R. L., Elec. Engr. Cmptr. Sys. Engr. Mgr., 1985. B.S., M.S., Auburn
- SIMPSON, JAMES M., Assistant Professor (Art), 1985. B.A., W. Illinois; M.S., M.F.A., Illinois State
- SIMPSON, LYNDAL B., Instructor (Accountancy), 1988. B.S., Auburn
- SIMPSON, ROBERT G., Associate Professor (Rehab. & Spec. Ed.), 1979, 1983. B.A., Vanderbilt; M.A., Kentucky; Ph.D., Florida
- SIMPSON, STEPHEN T., Associate Professor (S. An. Surg. & Med.), 1982, 1984. D.V.M., Auburn; M.S., Purdue
- SIMS, REBECCA, Asst. to Registrar, Registrar's Ofc., 1973, 1982. B.S., Auburn
- SINHA, SUBHASH C., Associate Professor (Mech. Engr.), 1968, 1977. B.S., Bihar Inst. of Ranchi-India; M.S., Inst. of Science-India; Ph.D., Wayne State

- SISK, KATHARINE S., *System Support Spec. I, Tech. Support*, 1986. B.S., Auburn
- SLAGH, TIM D., *Associate Professor (Elec. Engr.)*, 1958, 1965. B.S., Michigan M&T; M.S., Auburn
- SLAMINKA, EDWARD E., *Assistant Professor (Math-FAT)*, 1985. B.S., Case-Western Reserve; M.S., Ph.D., Michigan
- SLAMINKA, PATRICIA A., *Instructor (Cmpt. Sci. & Engr.)*, 1985. B.S., Case-Western Reserve; M.B.A., E. Michigan
- SLATEN, B. LEWIS, *Associate Professor (Cons. Aff.)*, 1974, 1980. B.S., Ark. A&M; M.S., Arkansas; Ph.D., Maryland
- SLICK, JANINE M., *Personnel Specialist, Personnel Svcs.*, 1987. B.S., N. Arizona; M.S., Troy State
- SMITH, BRET H., *Assistant Professor (Ind. Design)*, 1985. B.S., M.A., M.A., Purdue
- SMITH, CHARLES H., *Varsity Basketball Coach, Athletic Dept.*, 1978. B.S., Milligan; M.S., Virginia
- SMITH, CURTIS R., *Professor (Comm. Dis.)*, 1969, 1982. B.S., M.S., Ph.D., Sou. Miss.
- SMITH, DAVID M., *Librarian III and Head of Cataloging (Library)*, 1969, 1981. A.B., Huntingdon; M.L.S., Emory
- SMITH, DONNA E., *Librarian II, Library*, 1987. B.S., Delta State; M.L.S., Mississippi
- SMITH, ELIZABETH L., *Specialist, Engineering Extension EES*, 1988. B.S., Auburn
- SMITH, FOREST T., *Assistant Professor (Pharm. Sci.)*, 1987. Ph.D., Va. Commonwealth; Postdoctoral, N. Carolina
- SMITH, JAMES W., *Assistant Professor (Market. & Transp.)*, 1968. B.S., Athens; J.D., Samford
- SMITH, JERRY F., *Executive Director, Alumni & Development*, 1971, 1985. B.S., Auburn; M.Ed., Livingston
- SMITH, LARRY K., *Systems Suppt. Spec. III, Tech Suppt.*, 1983. B.S., Auburn
- SMITH, LEO A., *Professor (Ind. Engr.)*, 1969, 1984. B.I.E., M.S.I.E., Georgia Tech; Ph.D., Purdue
- SMITH, MARCIE C., *Auditor I, Internal Auditing*, 1985. B.S., Alabama; B.B.A., N. Florida
- SMITH, MARY R., *Staff Nurse, Drake S.H.C.*, 1983. B.S., Emory
- SMITH, MICHEL, *Professor (Math.-MHT)*, 1974, 1986. B.A., Texas; Ph.D., Emory
- SMITH, PAUL C., *Professor (Pathobiol.)*, 1980. D.V.M., Auburn; M.S., Ohio State; Ph.D., Iowa State
- SMITH, ROBERT C., *Professor (An. & Dairy Sci.)*, 1961, 1969. B.S., Elmhurst; Ph.D., Illinois College of Medicine
- SMITH, ROBERT E., *Assistant Director, University Cmptng.*, 1969, 1980. B.S., Sou. Illinois
- SMITH, RODNEY T., *Assistant Professor & Alumni Writer-In-Residence (English)*, 1976, 1988. B.A., N. Carolina; M.A., Appalachian State
- SMITH, SUSAN O., *Accounting Specialist, Controller*, 1984, 1988. B.S., Sou. Mississippi
- SMITH, TERRY V., *Nurse Practitioner, Stu. Health Ctr.*, 1987. Certificate, California State
- SMITH, THOMAS A., *Assistant Professor (Fam. & Child Dev.)*, 1985, 1986. B.S., M.A., Alabama; M.S., Auburn; Ph.D., Va. Tech
- SMITH, THOMAS R., *Professor (Music) & Dir., Choral Act.*, 1972, 1984. B.M., Samford; M.A., Iowa; D.M.A., Colorado
- SMITH, TOMMY G., *Instructor (Curriculum & Teaching)*, 1986, 1988. B.S., M.Ed., Auburn
- SMYTH, G. BARRY, *Assistant Professor (L. An. Surg. & Med.)*, 1984. B.V.Sc., Melbourne; M.A.C.V.Sc., College of Vet. Sciences (Australia)
- SNIPES, ALBERT L., *Coord., Employee Relations, Personnel Svcs.*, 1972, 1984. B.S., Alabama A&M; M.S., Troy State
- SNOW, CHARLES R., *Associate Professor (Management)*, 1969. B.S.I.M., Auburn; M.S.I.M., Ga. Tech; D.B.A., Indiana
- SNYDER, CHARLES A., *Associate Professor (Management)*, 1978, 1983. B.F.A., Georgia; M.B.A., Ohio St.; M.S., S. Dakota St.; Ph.D., Nebraska
- SOBEL, JOEL, *Instructor (Nutrition & Foods)*, 1988. B.S., Florida Atlantic
- SOLLIE, DONNA L., *Assistant Professor (Fam. & Child Dev.)*, 1979, 1986. B.S., Miss. St.; M.S., Kentucky; Ph.D., Tennessee
- SOLOMON, HARRY M., JR., *Hollifield Professor (English)*, 1971, 1983. B.A., Stephen F. Austin; M.A., Ph.D., Duke
- SOLOMON, MARTHA M., *Professor (Speech Comm.)*, 1974, 1980. B.A., Rice; M.A., Ph.D., Texas
- SOMERS, GREG L., *Assistant Professor (Forestry)*, 1987. B.S., Oklahoma State; M.S., Ph.D., Va. Tech
- SORJONEN, DONALD C., *Associate Professor (S. An. Surg.)*, 1975, 1986. B.S., D.V.M., Texas A&M; M.S., Auburn
- SPANO, JOSEPH S., *Professor (Pathobiol.)*, 1973, 1983. D.V.M., Ph.D., Colorado State
- SPEARROW, THOMAS W., IV, *Manager, Coliseum*, 1969, 1979. B.S., Auburn
- SPEIRS, VICTOR C., *Professor (Lg. An. Sur. & Med.)*, 1987. B.V.Sc., M.V.Sc., Melbourne
- SPENCER, SAMIA I., *Professor (Foreign Languages)*, 1972, 1985. B.A., Alexandria; M.A., Ph.D., Illinois
- SPENCER, DONALD J., *Associate Professor (Aerosp. Engr.)*, 1986. B.A.E., M.A.E., Auburn; Ph.D., Illinois
- SPRINGFIELD, CHARLES W., JR., *Assistant Professor (Civil Engr.)*, 1983. B.S.E., M.S.E., UAB; Ph.D., Ga. Tech
- SQUILLACOTE, MICHAEL E., *Associate Professor (Chemistry)*, 1987. B.S., Chicago; Ph.D., UCLA; Post Doc., Cal Tech
- ST. JOHN, DWIGHT W., *Assistant Professor (English)*, 1977. B.A., Hamline; M.A., Ph.D., Ohio
- STABLER, STEPHEN G., *Instructor (Build. Sci.)*, 1980. B.S., Troy State; B.S., Auburn
- STACK, STEVEN, *Professor (Sociology)*, 1985. B.A., M.A., Ph.D., Connecticut
- STALLINGS, J. MICHAEL, *Assistant Professor (Civil Engr.)*, 1988. B.C.E., M.S.C.E., Auburn; Ph.D., Texas
- STALLINGS, PAUL R., *Visiting Assistant Professor (Math-FAT)*, 1986, 1988. B.S., Ph.D., Auburn
- STALLWORTH, TOM A., *Registrar*, 1965, 1973. B.S., M.B.A., Auburn
- STANBURY, DAVID M., *Associate Professor (Chemistry)*, 1987. B.A., Duke; Ph.D., Sou. California
- STANTON, ANNETTE L., *Assistant Professor (Psychology)*, 1982. B.A., Kansas; M.A., Ph.D., Connecticut
- STARR, PAUL D., *Professor (Socio.)*, 1975, 1985. A.B., U. of the Pacific; M.A., Ph.D., Calif.-Santa Barbara
- STEEL, D. BERNIE, *Research Associate (Botany-Microbiology)*, 1988. B.S., M.S., Auburn
- STEISS, JANET E., *Assistant Professor, Scott-Ritche Research*, 1986. B.Sc., Waterloo; D.V.M., Guelph; Ph.D., Georgia
- STEPHENS, MICHAEL H., *Assistant Training Counselor, Athletic Dept.*, 1987. B.S., Weber State
- STEPHENSON, JOSEPH, *Associate Professor (Music)*, 1967, 1979. B.M., M.M., Peabody Conservatory
- STEWART, GENE B., *Acad. Comput. Spec. III (Univ. Comptng.)*, 1983, 1984. B.A., TCU; M.S., Auburn
- STEWART, JOHN M., *Mgr., Systems Prog., Tech Suppt.*, 1979, 1982. B.S., M.S., Auburn
- STIEFEL, ANITA J., *Assistant Editor, News Bureau, University Relations*, 1987. B.A., M.S.C., Auburn
- STOKLEY, BEVERLY P., *Admin. Asst., Intercol. Athletics*, 1986. B.S., Auburn
- STONE, JAMES H., *Director, Ed. TV*, 1972, 1977. B.A., David Lipscomb; M.A., Michigan State
- STRAITON, HARMON T., JR., *Librarian II & Head Microforms (Library)*, 1980. B.S., Auburn; M.L.S., Alabama

- STRAWN, SARAH S., *Instructor (Nutrition & Foods)*, 1970, 1977. B.S., N. Carolina; M.S., Tennessee
- STREET, DONALD R., *Associate Professor (Economics)*, 1965, 1968. B.S., M.S., Auburn; Ph.D., Penn. State
- STREET, MARY G., *Assistant Professor (Voc. & Adult Ed.)*, 1968, 1984. B.S., Jacksonville State; M.Ed., Ed.D., Auburn
- STRICKLAND, MARY W., *Admin. Asst. (Nursing)*, 1974, 1985
- STRINGFELLOW, DAVID A., *Professor (Pathobiol.)*, 1983, 1986. D.V.M., Cornell; M.S., Auburn
- STRINGFELLOW, JOYCE S., *Diag. Microb., Adj. Inst. (Microb.)*, 1977. B.S., M.S., Auburn
- STRNISTE, PHILLIP B., *Research Specialist (Horticulture)*, 1988. B.S., M.S., Auburn
- STROUD, JAMES E., *Mgr., Foy Union Operations*, 1974
- STRUEMPLER, BARBARA J., *Nutrition Specialist (Nutrition & Foods)*, 1984. B.S., Nebraska; M.S., Ph.D., Iowa State
- STUART, BARBARA L., *Instructor (English)*, 1988. B.A., Univ. of the South; M.Ed., S. Carolina; M.A., Georgia St.; Ph.D., Emory
- STUCKWISCH, FRANCES A., *Instructor (Nursing)*, 1986. B.S.N., New Mexico; M.N., Emory
- STUCKWISCH, STEPHEN E., *Assistant Professor (Math-FAT)*, 1982. B.A., SUNY-Binghamton; M.A., Ph.D., Arizona State
- SUGG, JANET R., *Artist, Ed. L.R.C.*, 1981. B.A., N. Alabama
- SUHLING, JEFFREY C., *Assistant Professor (Mech. Engr.)*, 1985. B.S., M.S., Ph.D., Wisconsin
- SULLIVAN, KELLY M., *Cross Country Coach, Athletic Dept.*, 1985. B.S., Willamett; M.S., Lewis & Clark
- SULLIVAN, MICHAEL J., *Assistant Professor (Finance)*, 1988. B.S., St. John Fisher; M.B.A., Florida; Ph.D., FSU
- SULLIVAN, PATRICK J., *Assistant Football Coach, Athletic Dept.*, 1986. B.S., Auburn
- SUMMERFORD, ROY, *Editor, Univ. Relations*, 1983. B.A., Auburn; M.S., Ga. College; M.S., Troy State
- SUMMERVILLE, WILLIAM L., *Associate Professor (Music)*, 1980. B.Mus., Alabama; M.Mus., Indiana; A.Mus.D., Michigan
- SUTTON, CHARLOTTE D., *Assistant Professor (Management)*, 1986. B.A., M.B.A., Baylor; Ph.D., Texas A&M
- SVACHA, ANNA J., *Assistant Professor (Nutrition and Foods)*, 1972. B.S., Va. Tech; M.S., Ph.D., Arizona
- SWAIM, JANN B., *Manager, Technical Svcs.*, 1986, 1988.
- SWAIM, STEVEN F., *Professor & Director (Scott-Ritchey Res. Lab.)*, 1969, 1984. B.S., D.V.M., Kansas State; M.S., Auburn
- SWANGER, DAVID B., JR., *Academic Cmpng. Spec. II, University Computing*, 1985. B.S., Auburn
- SWANGO, LARRY J., *Associate Professor (Pathobiol.)*, 1972, 1977. B.S., D.V.M., Okla. State; Ph.D., Purdue
- SWANSON, DONALD G., *Alumni Professor (Physics)*, 1980, 1985. B. Theol., NW Christian; B.S., Oregon; M.S., Ph.D., Calif.-Tech
- SWINEHART, KERRY D., *Instructor (Management)*, 1987. B.A., S. Florida; M.B.A., Georgia
- SWINSON, STEPHEN K., *Mech. Mgr., Utility Facilities*, 1983. B.S.M.E., Auburn
- SWINSON, W. FRANK, *Professor (Civil Engr.)*, 1960, 1967. B.A., Rice; B.S.M.E., Texas Tech; M.S.M.E., Texas A&M; Ph.D., Illinois
- SZECHI, DANIEL, *Associate Professor (History)*, 1988. B.A., Sheffield; Ph.D., Oxford
- SZULGA, JERZY, *Associate Professor (Math-ACA)*, 1987. M.S., Ph.D., Wroclaw-Poland
- TABOR, RICHARD H., *Assistant Professor (Accountancy)*, 1985. B.S., M.B.A., Tennessee; Ph.D., Florida
- TAM, TIN YAU, *Assistant Professor (Math-ACA)*, 1988. B.Sc., Ph.D., Hong Kong
- TAMBLYN, JOHN W., *Professor (Music)*, 1948, 1962. B.S., B.S., Auburn; M.Mus., Ph.D., Rochester
- TANJA, JON J., *Associate Professor (Clin. Pharm. Prac.)*, 1974. B.S., Ferris State; M.S., Iowa
- TARER, ARTHUR R., *Professor (Chem. Engr.)*, 1974, 1983. B.S., Auburn; M.S., Ph.D., Purdue
- TATARCHUK, BRUCE J., *Assistant Professor (Chem. Engr.)*, 1981. B.S., Illinois; Ph.D., Wisconsin
- TATUM, JULIA M., *Cont. Ed. Inst., Continuing Education*
- TAUGNER, AGNES B., *Professor (Art)*, 1963, 1984. B.F.A., M.F.A., Illinois
- TAYLOR, C. ROBERT, *Professor & Alfa Eminent Scholar (Agri. Econ. & Rural Soc.)*, 1988. B.S., Oklahoma St.; M.S., Kansas St.; Ph.D., Missouri
- TAYLOR, JANET B., *Associate Professor (Curr. & Teach.)*, 1979, 1988. B.S., M.Ed., Francis Marion; Ph.D., FSU
- TAYLOR, NANCY D., *Accounting Specialist, Engr. Admin.*, 1988.
- TAYLOR, RICHARD F., *Instructor (Accountancy)*, 1988. B.G.E., Nebraska; B.S., Troy State; A.B.D., M.S., Alabama
- TEDESCO, JOSEPH W., *Associate Professor (Civ. Engr.)*, 1984, 1988. B.S.C.E., Notre Dame; M.S.C.E., Tufts; Ph.D., Lehigh
- TEER, PATRICIA A., *Associate Professor (Pathobiol.)*, 1959, 1971. D.V.M., M.S., Auburn; Ph.D., Colorado State
- TEIRLINCK, LUC M., *Associate Professor (Math-ACA)*, 1982, 1985. B.Math., Ph.D., Vrije U.-Brussels
- TERRY, BETSY J., *Instructor (Market. & Transp.)*, 1979, 1982. B.S., M.B.A., Auburn
- THAXTON, G. DONALD, *Associate Professor (Physics)*, 1966, 1977. B.S., Richmond; Ph.D., N. Carolina
- THAXTON, HELEN A., *Admin. Assistant, VP-Extension*, 1972, 1988.
- THAYER, LESLIE E., *Assistant Baseball Coach, Athletic Dept.*, 1984. B.A., Buena Vista; M.A., Gonzaga
- THEOBALD, RICHARD P., *Diving Coach, Athletic Dept.*, 1984. B.S. Sou. Illinois
- THOMAS, CHARLES M., *Comptr Secur. Adminstr., Univ. Cmpng.*, 1979, 1983. B.S., M.B.A., Auburn
- THOMAS, FRED H., *Office Manager (L. An. Surg. & Med.)*, 1978
- THOMAS, JONI M., *Programmer III, Admin. Cmpng. Svc.*, 1985, 1986. B.A., Alabama
- THOMAS, MYRA S., *Instructor (Rehab. & Special Ed.)*, 1989. B.S., S. Carolina; M.S., Tennessee
- THOMAS, ROBERT E., *Assistant Professor (Ind. Engr.)*, 1988. B.S., Georgia Tech; M.S., Ph.D., Texas A&M
- THOMAS, WILLIAM B., *Resident (Sm. An. Surg. & Med.)*, D.V.M., Auburn
- THOMASSON, C. LARRY, *Associate Professor (Clin. Pharm. Prac.)*, 1966. B.S., Cincinnati; Ph.D., Florida
- THOMPSON, EMMETT F., *Dean & Professor (Forestry)*, 1977, 1985. B.S., Oklahoma St.; M.S., N.C. State; Ph.D., Oregon State
- THOMPSON, HENRY L., *Assistant Professor (Economics)*, 1987. B.S., Ph.D., Houston
- THOMPSON, ISABELLE, *Assistant Professor (English)*, 1982. B.A., N.C. Wesleyan; M.A., N.C. St.; M.A.T., Ed.D., Duke
- THOMPSON, MARY J., *Assistant Professor (Voc. & Adult Ed.)*, 1985. B.S., W. Michigan; M.A., S. Florida; Ed.S., FSU; Ed.D., Penn State
- THOMSON, A. HUGH, *Men's Tennis Coach, Athletic Dept.*, B.S., B.S., Miss. State
- THORNE, JACK F., *Professor (Accountancy)*, 1972, 1977. B.S., Auburn; M.A., Ph.D., Alabama

- THORNTON, MARK, *Instructor (Economics)*, 1988. B.S., St. Bonaventure
- THROCKMORTON, MATT A., *Staff Physician, S.H.C.*, 1977. B.A., Friends; M.D., Kansas
- THUDUM, LAURA L., *Assistant Professor (Theatre)*, 1988. B.S.E., N.E. Missouri State; M.F.A., Iowa
- TIN, CHIN-CHE, *Post Doctoral Fellow (Physics)*, 1987. B.S., M.S., London; Ph.D., Alberta
- TOBIAS, TODD A., *Intern (S. An. Sur. & Med.)*, 1987. B.A., D.V.M., New York State Coll. of Vet. Med.
- TOIVIO-KINNUNAN, MARIA A., *Research Associate (Pathobiol.)*, 1983, 1984. M.S., Helsinki; M.S., Ph.D., Minnesota
- TOLE, THOMAS M., *Assoc. Professor (Finance)*, 1974, 1982. B.C.E., M.B.A., Marquette; D.B.A., Oklahoma
- TOMLIN, JUDY G., *Coord., Stdnt. Svc. (Education)*, 1973, 1985. B.S., M.Ed., Ed.D., Auburn
- TOMLINSON, RICHARD D., *Mechanical Engineer, Facilities, B.S.M.E.*, Kensington
- TONEY, KIM W., *Mgr. Sc. Supp. Store (Chemistry)*, 1982, 1984. B.S., Auburn
- TOWNSEND, IRIS D., *Adm. Asst. (Business)*, 1978, 1980. A.A., Alex City JC
- TRANSUE, WILLIAM R. R., *Associate Professor (Math-FAT)*, 1967, 1971. A.B., Harvard; Ph.D., Georgia
- TRENTHAM, GARY L., *Professor (Cons. Aff.)*, 1972, 1982. B.S., M.A., Murray State; M.F.A., Indiana
- TRENTHAM, LANDA L., *Associate Professor (EFLT)*, 1972, 1980. B.S., Kentucky; M.A., Murray State; Ed.D., Indiana
- TRIMBLE, WILLIAM F., *Assistant Professor (History)*, 1985. B.A., M.A., Ph.D., Colorado
- TRUPP, KIM L., *Asst. Dir. of Housing, Student Housing*, 1979, 1985. B.S., Auburn
- TRUPP, THEODORE C., *Assistant Coordinator, Rec. Svcs.*, 1981, 1984. B.S., M.Ed., Auburn
- TSANG, THUY-NHIEN, *Systems Analyst I, Admin. Comp. Svc.*, 1986. A.B., California
- TSING, NAM-KIU, *Assistant Professor (Math-ACA)*, 1985. B.A., Ph.D., Hong Kong
- TURNQUIST, PAUL K., *Professor & Head (Ag. Engr.)*, 1977. B.S., Kansas State; M.S., Ph.D., Oklahoma State
- TWALE, DARLA J., *Assistant Professor (EFLT)*, 1987. B.A., Geneva; M.A., Duquesne; Ph.D., Pittsburgh
- TYLENDA, BARBARA, *Assistant Professor (Psychology)*, 1987. A.B., Holy Cross; M.A., Ph.D., Sou. Illinois
- TYREE, KIRK J., *Director, Facilities*, 1988. B.S., Air Force
- TZENG, YONHUA, *Assistant Professor (Elec. Engr.)*, 1983. B.S., Natl. Taiwan; M.S., Ph.D., Texas Tech
- UHLIG, FRANK D., *Professor (Math-ACA)*, 1982. M.A., Ball St.; Ph.D., Cal Tech; Dr. Vernat. habil. Wurzburg; Privatdozent, apl. Prof. RWTH, Aachen
- ULLERY, WILLIAM D., *Assistant Professor (Math-ACA)*, 1987. B.A., Harvard; M.S., Ph.D., Arizona
- ULRICH, PAMELA V., *Instructor (Consumer Affairs)*, 1987. B.S., Oregon St.; M.S., Auburn
- UNGER, VERON E., *Professor & Head (Ind. Engr.)*, 1979. B.E.S., M.S.M.S., Ph.D., Johns Hopkins
- URBAN, MICHAEL E., *Associate Professor (Pol. Sci.)*, 1982, 1984. B.A. Seattle; M.A., Alberta; Ph.D., Kansas
- VALAIRE, BRUCE T., *Assistant Professor (Mech. Engr.)*, 1985. B.S.M.E., New South Wales-Australia; M.E., Newcastle-Australia; Ph.D., Sherbrooke-Canada
- VALINE, WARREN J., *Professor (Coun. & Coun. Psych.)*, 1971, 1984. B.A., Hardin-Simmons; M.Ed., Houston; Ph.D., Georgia
- VAN CASTEL, ADA L., *Assistant Professor (English)*, 1985. Cand., Drs., Amsterdam; Ph.D., Penn. State
- VAN NOSTRAND, PANTHEA R., *Auditor I, Internal Auditing*, 1987. B.S. Auburn
- VAN SANTEN, VICKI L., *Assistant Professor (Pathobiology)*, 1988. B.A., McPherson; Ph.D., Chicago
- VAN VALKENBURGH, REBECCA G., *EDP Auditor, Internal Auditing*, B.S., Troy State; M.B.A., Auburn
- VANOY, WILLIAM G., *Supervisor IV, Coliseum*, 1985, 1986. B.S., Navy
- VAUGHAN, JOHN T., *Dean of Veterinary Medicine*, 1974, 1977. D.V.M., M.S., Auburn
- VAUGHN, BRIAN E., *Professor (Fam. & Child Devel.)*, 1988. B.A., Arizona State; M.A., Ph.D., Minnesota
- VAUGHN, CHARLES J., *Instructor (English)*, 1984. B.A., Rhodes; M.A., Indiana
- VAUGHN, DANA M., *Assistant Professor (Scott-Ritchey Research)*, 1985. B.S., M.S., SW Texas; Ph.D., Texas
- VECILLO, ROBERT L., *Associate Professor (Civil Engr.)*, 1973, 1980. B.C.E., M.S., Ph.D., Ohio State
- VEDDER, JOHN D., *Supervisor, AU Aviation*, 1980, 1983. B.S., M.S.L.S., N. Carolina
- VEEH, JERRY A., *Associate Professor (Math-ACA)*, 1981, 1986. B.B., M.A., Ph.D., California-Irvine
- VEST, FLOYD, *Admin. Proj. Mgr., Admin. Cmptng. Svc.*, 1977, 1981. B.S., M.B.A., Auburn
- VEST, TERESA P., *Accounting Manager, Food Service*, 1984, 1987. B.S., B.S.B.A., Auburn
- VICK, J. CLAIRE, *Research Associate, Truman Pierce Institute*, 1988. B.A., Auburn
- VILLAUME, SUSAN E., *Assistant Professor (Curr. & Teach.)*, B.A., Carson Newman; M.S., Tennessee; Ph.D., Ohio State
- VILLAUME, WILLIAM A., *Assistant Professor (Speech Comm.)*, 1983, 1984. B.A., Waterloo Lutheran; M.Div., Phila. Lutheran Sem; M.A., Ph.D., Ohio State
- VINSON, JOHNNIE B., *Associate Band Director & Professor (Music)*, 1969, 1984. B.S., M.Ed., Auburn; D.A., Mississippi
- VOITTE, ROBERT A., *Associate Dean of Agriculture*, 1981. B.S., M.S., W. Virginia; Ph.D., Tennessee
- VOLL, NONDAS J., *Prod./Dir., Ed. TV*, 1983. B.A., Wesleyan
- VONSCHENBACH, JOHN F., *Assistant to the Dean & Assoc. Prof. (Education)*, 1975, 1985. A.B., M.Ed., Ed.D., Temple
- WADDELL, DORIS M., *Instructor (Foreign Languages)*, 1987. B.A., Winthrop; M.A., Florida
- WADE, WILLIAM, *Associate Director, Admin. Univ. Cmptng.*, 1974, 1982. B.S., Auburn
- WAGH, VINAY P., *Research Associate (Chem. Engr.)*, 1985, 1988. B.S., Bombay; M.S., Auburn
- WAGONER, GARY W., *Associate Professor (Art)*, 1980, 1987. B.S.A., Wichita State; M.S.A., Alfred
- WAITES, DARYL K., *Manager, Analyt. Inst. (Engineering)*, 1985. A.A., S. Union
- WALDROP, HERBERT M., *Assistant Professor & Athletic Trainer (HHP)*, 1960, 1967. B.S., M.S., Auburn
- WALKER, CHRISTINE, *Clinical Supvr. (Comm. Disorders)*, 1986. B.S., M.S., FSU
- WALKER, ROBERT P., *Associate Professor (Textile Engr.)*, 1968, 1973. B.S.T.M., Auburn; M.S., Inst. of Textile Technology
- WALKER, WILLIAM F., *Dean & Professor (Engineering)*, 1988. B.S., M.S., Texas; Ph.D., Oklahoma State
- WALL, HINDMAN P., *Associate Director of Athletics, Athletic Dept.*, 1986. B.S., Auburn
- WALL, JAMES R., *Professor & Head (Math-ACA)*, 1971, 1984. A.B., Knox; M.A., Nebraska; Ph.D., Tennessee
- WALLACE, SHELLIE S., *Assistant Professor (Lg. An. Surg. & Med.)*, 1989. B.S., D.V.M., Kansas State

- WALLS, BILLY G., *Director of Bands & Professor (Music)*, 1961, 1985. B.M., Baylor; M.M., Manhattan Music; Ph.D., FSU
- WALTERS, KENNETH W., *Assistant Professor (Philosophy)*, 1964, 1966. B.A., Roosevelt; M.A., Ph.D., Northwestern
- WALTERS, NORMA J., *Assistant Professor (Voc. & Adult Ed.)*, 1981. R.N., S. Miss.; B.S., Rollins; M.S., Ed.S., Ph.D., FSU
- WALTON, JACK, *Chief, AU Police*, 1981. B.S., Troy State
- WALTON, KATHRYN W., *Assistant Director, Alumni*, 1988. B.A., Auburn
- WALTON, MELODY G., *Assistant Director I, Alumni*, 1983, 1987.
- WARBINGTON, THOMAS L., *Assoc. Professor (Foreign Lang.)*, 1960, 1978. B.S., Miss. College; M.A., Mississippi
- WARD, CHARLOTTE R., *Associate Professor (Physics)*, 1959, 1975. B.S., Kentucky; M.S., Ph.D., Purdue
- WARD, CHRISTOPHER, *Assistant Professor (Comp. Science & Engr.)*, 1988. B.Sc., Hatfield; M.S., Ph.D., Florida
- WARD, CURTIS H., *Professor (Chemistry)*, 1961.
- WARD, D. SCOTT, *Instructor (English)*, 1988. B.S., Auburn; M.A., S. Carolina
- WARD, KEITH J., *Associate Professor & Director (Pol. Sci. & Ctr. for Gov't. Svcs.)*, 1973, 1976. B.S., M.P.A., BYU; Ph.D., Tennessee
- WARD, LAVIECE, *Instructor (English)*, 1988. B.A., N. Carolina; M.A., Ph.D., Colorado
- WARE, MORRIS T., *Manager (S. An. & Surg.)*, 1979, 1986. A.A.S., Sou. Union
- WARFIELD, CAROL L., *Associate Professor (Cons. Aff.)*, 1977, 1982. B.S., S. Dakota State; M.S., Ph.D., Illinois
- WARREN, BEVERLY J., *Assistant Professor (HHP)*, 1988. B.S.P.E., N. Carolina; M.S., Sou. Illinois; Ed.D., Alabama
- WASHINGTON, JOEY L., *Systems Analyst I, Admin. Cmping. Svc.*, 1979, 1981
- WASHINGTON, WILLIAM T., *Assistant Professor (HHP)*, 1958, 1967. B.S., M.Ed., Auburn
- WATERS, BILLIE P., *Assistant Professor (Fam. & Child Dev.)*, 1985. B.F.A., Georgia; M.Ed., Ed.S., W. Georgia; Ed.D., Auburn
- WATERS, J. PATRICK, *Academic Adviser, Athletics*, 1966, 1978. B.A., Auburn; M.A., Florida
- WATERS, MARY R., *Instructor (English)*, 1966, 1971. B.A., Stetson; M.A., Florida; Ph.D., Auburn
- WATKINS, CATHY L., *Instructor (EFLT)*, 1987. B.A., M.A., Cal State-Stanislaus; Ph.D., Florida
- WATSON, PATRICIA C., *Instructor (Management)*, 1985. B.A., M.S., Auburn
- WATSON, WILLIAM H., *Assistant Director, Student Financial Aid*, 1972. B.A.E., Florida
- WEAR, MARY JO, *Administrative Assistant, Student Affairs Office*, 1967, 1983
- WEAR, ROSE L., *Assistant Director, Learning Resources Ctr.*, 1981, 1984. B.A., N. Carolina
- WEAVER, ANDREW M., *Professor & Head (Curr. & Teach.)*, 1960, 1969. B.S., Tenn. Tech; M.A., Ed.D., Tennessee
- WEAVER, MARK J., *Visiting Assistant Professor (Architecture)*, 1988. B.L.A., Michigan State; M.L.A., Virginia Tech
- WEAVER, TERESA P., *Research Associate, Planning & Analysis*, 1985. B.S., Auburn
- WEBB, THOMAS R., *Associate Professor (Chemistry)*, 1975, 1982. B.S., Oregon St.; Ph.D., Iowa State
- WEIDNER, WILLIAM E., *Professor & Head (Comm. Dis.)*, 1979, 1982. B.S., M.S., Bowling Green; Ph.D., Case-Western Reserve
- WEISS, PETER M., *Assistant Professor (Build. Sc.)*, 1983. B.A., Iowa State; B.Arch., Arizona; M.A., Cornell
- WEISS, RICHARD C., *Assistant Professor (Scott-Ritchey Research)*, 1985. B.S., Rutgers; V.M.D., Pennsylvania; Ph.D., Cornell
- WELCH, WINIFRED D., *Assistant Director, Admissions*, 1983, 1985. B.S., Arkansas; M.Ed., Auburn
- WELDON, BETTY A., *Assistant Mgr. Inventory, Univ. Bookstore*, 1982, 1984
- WELT, ELINOR W., *Professor (English)*, 1987. B.A., Morningside; M.A., S. Dakota; Ph.D., Iowa
- WERNER, WARREN W., *Assistant Professor (English)*, 1983. B.A. Goddard; M.A., Ph.D., Ohio
- WERSINGER, JEAN-MARIE P., *Associate Professor (Physics)*, 1979, 1982. B.Sc., Academic de Grenoble; Ph.D., Ecole Polytechnique Federale de Lausanne
- WESTFELD, JOHN S., *Assistant Professor & Coord. (Coun. & Coun. Psych.)*, 1983. B.A., M.P.H., Ph.D., N. Carolina
- WESTER, EDWARD E., *Instructor (Zoo-Wildlife Sc.)*, 1986. B.S., Columbus; M.S., Auburn
- WESTLEY, MARTIN J., *Visiting Scholar (Ind. Design)*, 1989. B.S.I.D., Georgia Tech
- WESTMORELAND, THOMAS, *Volunteer Svc. Coord., Project Uplift*, 1973. B.A., Moorhead
- WHALEN, DAMIEN, *Instructor (English)*, 1988. B.A., M.F.A., Montana; M.A., Purdue
- WHITE, BONNIE J., *Assistant Professor (Voc. & Adult Ed.)*, 1974, 1979. B.A., Evangel; M.S., FSU; M.A., E. Kentucky; Ed.D., Tennessee
- WHITE, CHARLES R., *Associate Professor (Industrial Engr.)*, 1966. B.S.M.E., M.S.I.E., Ph.D., Purdue
- WHITE, J. HERBERT, *Director, University Relations*, 1960, 1983. B.S., Auburn
- WHITE, PAUL E., *Training Counselor, Athletic Dept.*, 1981, 1984. B.S., Arkansas Tech
- WHITE, STEPHEN W., *Associate Professor (Philosophy)*, 1985. B.A., Oglethorpe; M.A., Ph.D., Georgia
- WHITE, TIMOTHY R., *Instructor (Speech Comm.)*, 1988. B.A., B.A., Oakland; M.A., Wisconsin
- WHITMIRE, DAVID R., *Visiting Assistant Professor (Chem. Engr.)*, 1988. B.S., Clemson; M.S., VPI
- WHITMIRE, PAULA S., *Instructor (Mathematics)*, 1984. B.S., Furman; M.A., Va. Tech
- WHITT, JOE, *Asst. Football Coach, Athletic Dept.*, 1981. B.S., M.S., Ala. State
- WHITTEN, DAVID O., *Professor (Economics)*, 1968, 1982. B.S., Charleston; M.A., S. Carolina; Ph.D., Tulane
- WIDDOWSON, MARK A., *Postdoctoral Fellow (Civil Engr.)*, 1986. B.S., Cincinnati; M.S., Kansas; Ph.D., Auburn
- WIDELL, JANET A., *Instructor (Nursing)*, 1987. B.S.N., Columbia; M.S.N., Alabama-Birmingham
- WIDELL, ROBERT W., *Assistant Professor (Pol. Sci.)*, 1972, 1974. A.B., Duke; Ph.D., Stanford
- WIENS, GLORIA J., *Assistant Professor (Mech. Engr.)*, 1980, 1986. B.S., M.S., Kansas State; Ph.D., Michigan
- WIGGINS, LORNA A., *Librarian III and Business Librarian (Library)*, 1968, 1981. B.A., Agnes Scott; M.L.S., Emory
- WIGGINS, MATTHEW D., *Assistant Professor (S. An. Surg. & Med.)*, 1974. D.V.M., Auburn
- WILKINS, JAMES R., *Assistant Director, Engr. Extension Service*, 1956, 1975. B.M.E., M.M.E., Auburn
- WILCOX, ROY C., *Associate Professor (Mech. & Mat. Engr.)*, 1969. B.S., M.S., Va. Tech; Ph.D., Missouri
- WILDER, BARBARA, *Instructor (Nursing)*, 1985. B.S.N., AUM; M.S.N., Troy State
- WILEY, ROBERT L., *Senior Research Fellow, Space Power Institute*, 1987. B.S.M.E., Maryland; M.S.M.E., Drexel

- WILKE, ARTHUR S., Associate Professor (Sociology), 1975, 1980. B.S., Wisconsin; M.A., Ph.D., Minnesota
- WILKEN, LEON O., JR., Professor (Pharm. Sci.), 1963, 1972. B.S., Pharm.D., Loyola; M.S., Ph.D., Texas
- WILKERSON, GAIL D., Admin. Assistant (Sciences & Math), 1974, 1986
- WILKINS, THOMAS J., Research Associate (Education), 1988. B.A., Auburn
- WILLIAMS, ANN H., Associate Professor (Zoo.-Wildlife Sc.), 1980, 1985. B.S., S. Carolina; M.A., Duke; Ph.D., N. Carolina
- WILLIAMS, DELBERT E., Research Associate (Chemistry), 1980. A.B., M.A., N. Carolina
- WILLIAMS, DOUGLAS F., Associate Professor (EFLT), 1970, 1978. B.A., N. Michigan; M.A., Michigan; Ph.D., Texas
- WILLIAMS, HAROLD H., Assistant Professor (Voc. & Adult Ed.), 1972. B.S., M.A., N. Alabama; Ph.D., Colorado State
- WILLIAMS, HUGH O., Professor (Art), 1957, 1985. B.A.A., Auburn; M.A., Columbia
- WILLIAMS, JAMES C., III, Professor & Head (Aerosp. Engr.), 1980. B.S., M.S., Va. Tech.; Ph.D., S. California
- WILLIAMS, JAMES S., Assistant Professor (Build. Sc.), 1982. B.S., Toledo; M.S., Clemson
- WILLIAMS, JOHN C., JR., Professor (Bot. & Microb.), 1970, 1982. B.S., M.S., N.C. State; Ph.D., Iowa State
- WILLIAMS, JOHN R., JR., Associate Professor (Physics), 1974. B.S., N. Georgia; Ph.D., N.C. State
- WILLIAMS, KING E., Assistant Professor (Journalism), 1983. B.A., M.A., Alabama
- WILLIAMS, MARY S., Assistant Professor (Curriculum & Teaching), 1988. B.S., M.S., Jacksonville State; Ed.D., Alabama
- WILLIAMS, MICHAEL L., Associate Professor (Entomol.), 1973, 1978. B.S., Ark. State; M.S., Ph.D., Va. Tech
- WILLIAMS, STEVEN B., Assistant Professor, Athletic Dept., 1987. B.A., Auburn
- WILLIAMSON, PETER A., Associate Professor (Curr. & Teach.), 1978. B.A., Williams; M.S., Bank Street; Ed.D., Georgia
- WILLIAMSON, W. WINDELL, Assistant Professor (Couns. & Couns. Psychology), 1988. B.A., M.Ed., Ed.D., Auburn
- WILLIFORD, LEX A., Instructor (English), 1987. B.A., M.A., Stephen F. Austin; M.F.A., Arkansas
- WILLIS, LARRY G., Manager of Field Engr., Op. Suppt., 1962, 1985
- WILMOTH, JAMES N., Professor (EFLT), 1970, 1978. B.S., Marshall; M.S., Ph.D., Wayne State
- WILSON, ARLETTE C., Assistant Professor (Accountancy), 1985. B.B.A., M.B.A., Mississippi; Ph.D., Arkansas
- WILSON, EDWARD H., Director, Government Affairs, 1985. B.S., Auburn
- WILSON, G. DENNIS, Professor & Head (HHP), 1973, 1983. B.S., Union; M.S., Ed.D., Tennessee
- WILSON, LAVISA K., Associate Professor (Curr. & Teach.), 1976. B.A., Augustana; M.S., Nebraska; Ph.D., Iowa
- WILSON, ROBERT C., Associate Professor (Physiol. & Pharmacol.), 1986. D.V.M., Auburn; Ph.D., Georgia
- WILSON, RUSSELL C., Associate Professor (Voc. & Adult Ed.), 1976, 1983. B.S., S. Dakota; M.Ed., Nebraska; M.Div., Wesley; Ph.D., Iowa
- WILT, GERALD R., Associate Professor (Pathobiol.), 1962, 1977. B.S., W. Kentucky; M.S., Clemson
- WINDUS, PAUL J., Flight Instructor I, AU Aviation, 1988. B.S., Georgia; M.Ag., Clemson
- WINTERFELDT, ESTHER A., Professor & Interim Head (Nutrition & Foods), 1988. B.S., M.S., Ph.D., Oklahoma State
- WISE, JACK P., Ext. Prog. Associate (Education), 1988. B.S., M.A., FSU; Ph.D., Florida
- WIT, LAWRENCE C., Associate Professor (Zoo.-Wildlife Sc.), 1976, 1982. B.S., Wheaton; M.S., S. Illinois; Ph.D., Missouri
- WOFFORD, CARL S., Asst. Mgr., Univ. Bookstore, 1983, 1984
- WOLFE, DWIGHT F., Assistant Professor (L. An. Surg. & Med.), 1980, 1983. D.V.M., M.S., Auburn
- WOLFE, LAUREN G., Professor & Head (Pathobiol.), 1981. D.V.M., M.S., Ph.D., Ohio State
- WOLTERS, ROGER S., Assistant Professor (Management), 1980, 1981. B.A., M.A., N. Florida; Ph.D., Illinois
- WOLVERTON, CLYDE L., Assistant Professor (Foreign Languages), 1961, 1975. B.A., Akron; M.A., Georgia
- WOOD, JAMES F., Student Loans Collector, Bursar's Ofc., 1981. B.S., Troy State
- WOOD, SHEILA, Admin. Assistant, Library, 1984, 1988
- WOOD, THOMAS A., Associate Professor (Rehab. & Sp. Ed.), 1980. B.S., FSU; M.Ed., Stetson; Ed.D., Peabody
- WOOTEN, MARIE W., Assistant Professor (Zoo.-Wildlife), 1987. B.S., Memphis State; Ph.D., Texas Woman's U
- WORDEN, THOMAS W., Assistant Professor (Curr. & Teach.), 1980. B.S., Ph.D., Ball State; M.S., Purdue
- WORDLEY, SHELBY D., Professor (Chemistry), 1974, 1982. B.S., Auburn; Ph.D., Texas
- WORMAN, WINIFRED H., Assistant Professor (Nursing), 1979, 1982. B.A., Houghton; M.N., Case-Reserve
- WORTHINGTON, JAMES S., Associate Professor (Accountancy), 1976, 1981. B.S., Pittsburg State; M.A., Ph.D., Missouri
- WORTHINGTON, LESLIE H., Instructor (English), 1988. B.A., AUM; M.A., Auburn
- WRIGHT, CLARENCE DAN, Associate Professor (EFLT), Director, LRC, 1970, 1983. B.S., Alabama; M.E., Ed.D., Auburn
- WRIGHT, DANIEL L., Instructor (English), 1988. B.A., M.A., Valparaiso; M.Div., Lutheran School; Ph.D., Ball State
- WRIGHT, JAMES C., Assistant Professor (Pathobiol.), 1985. B.S., Va. Tech; D.V.M., Georgia; M.S., Ph.D., Missouri
- WRIGHT, JON D., Instructor (English), 1987. A.B., M.A., W. Virginia
- WRIGHT, JONE P., Associate Professor (Curr. & Teach.), 1968, 1975. B.S., M.Ed., Georgia; Ph.D., Alabama
- WRIGHT, LYNNE A., Staff Physician, Drake S.H.C., 1987. B.S., Birmingham-Southern; M.D., S. Alabama
- WRIGHT, RUTH L., Assistant Professor (English), 1958, 1985. B.A., La Grange; M.A., Auburn
- WRIGHT, THOMAS L., Professor (English), 1960, 1977. B.A., M.A., Ph.D., Tulane
- WU, CHWAN-HWA, Assistant Professor (Elec. Engr.), 1987. B.S., National Chiao Tung; M.S., Ph.D., Polytechnic
- WYLIE, ROY, Assistant Professor, (Music), 1980, 1986. B.M., SMU; M.M., Manhattan School of Music; D.M.A., Texas
- WYNNE, REBECCA B., Systems Analyst I, Admin. Computer Svc., 1988. B.A., Auburn
- YATES, STEVEN A., Assistant Professor (Philosophy), 1988. B.A., Tulsa; M.A., Ph.D., Georgia
- YEAGER, ANITA J., Personnel Specialist, Personnel Svcs., 1988. B.A., Auburn
- YEAGER, LELAND B., Von Mises Professor (Economics), 1985. B.A., Oberlin; M.A., Ph.D., Columbia
- YERGER, SHELLEY A., Instructor (Nursing), 1987. B.S.N., M.S.N., Alabama-Birmingham
- YERKEY, JAMES R., Associate Bursar, Business Office, 1972, 1985. B.S., Troy State
- YOO, CHAI HONG, Gottlieb Professor (Civil Engr.), 1981, 1986. B.S.C.E., Seoul; M.S., Ph.D., Maryland
- YOUNG, DIANE, Research Associate (Phys. & Pharmacol.), 1978. B.S., Ph.D., Utah
- YOUNG, FRANK, JR., Assistant Football Coach, 1974. B.S., Delta State; M.E., Mississippi
- YOUNG, SAM W., Associate Professor (Math-FAT), 1975, 1976. B.A., M.A., Ph.D., Texas
- YOUNG, SANDRA S., Conference Facilitator, Conference Center, 1988. B.S., Auburn

- YU, JAMES C. M.**, Associate Professor (Mech. Engr.), 1967, 1971. B.S., Nat. Taiwan; M.S., Va. Tech; Ph.D., Auburn
- ZABASAJJA, JOHN N.**, Research Associate (Chem. Engr.), 1987. B.S., M.S., Ph.D., Akron
- ZALIK, RICHARD A.**, Professor (Math-ACA), 1978, 1985. M.A., Buenos Aires; D.Sc., Israel Technion
- ZEANAH, CLYDE M.**, Ext. Prog. Assoc., Educ. Ext. & Devel., 1988. B.S., M.A., Alabama; Ed.D., Columbia
- ZEE, RALPH**, Assistant Professor (Mech. Engr.), 1986. B.S., Wisconsin-Whitewater; M.S., M.S., Ph.D., Wisconsin-Madison
- ZENOR, PHILLIP LEE**, Professor (Math-FAT), 1968, 1983. B.S., M.S., Ph.D., Houston
- ZERBE, CAROLE A.**, Resident (Physio. & Pharm.), 1986. B.S., Va. Tech; D.V.M., Tennessee; M.S., Michigan State
- ZLATOS, CHRISTY**, Librarian II (Library), 1983. A.B., M.S.L.S., Illinois
- ZORR, PAUL A., JR.**, Associate Professor (Architecture), 1980. B.A., M.S., Illinois Inst. of Tech
- ZUCKERMAN, EDWARD D.**, Assistant Professor (Theatre), 1987. B.A., West Chester State; M.F.A., Wayne
- ZUK, GARY**, Assistant Professor (Political Science), 1988. B.A., Canisius; B.S., Ph.D., FSU

EMERITI

- ABNEY, LOUIS O., Professor Emeritus, Art, June, 1988. B.A.A., M.A.A., Auburn
- ADAMS, CLEVELAND L., Professor Emeritus, Textile Engineering, January, 1976. B.T.E., Auburn
- ADAMS, FRED, Professor Emeritus, Agronomy & Soils, January, 1985. B.S., M.S., LSU; Ph.D., California
- ADAMS, FREDERICK P., Associate Professor Emeritus, Management, January, 1987. B.S.E.E., Auburn; B.S.I.M., MIT; M.B.A., Alabama; Ph.D., FSU
- ALBERT ROOSEVELT A., JR., Professor Emeritus, Veterinary Ophthalmology, August, 1988. D.V.M., M.S., Auburn
- ALEXANDER, HERMAN D., Associate Professor Emeritus, Zoology & Wildlife Sciences, June, 1987. B.S., M.S., Ph.D., Auburn
- ALLEN, ROGER W., Dean Emeritus, Science & Literature, June, 1967. B.S., M.S., Auburn; M.S., Michigan; Ph.D., Columbia
- ALLEN, WARD S., Hargis Professor Emeritus, English, June, 1987. B.A., M.A., Ph.D., Vanderbilt
- ALLEN, WILLIAM H., JR., Professor Emeritus, Marketing & Transportation, December, 1981. A.B., Centre; J.D., M.A., Alabama; B.D., Union Theological Seminary
- ALLISON, RAY, Associate Professor Emeritus, Fisheries & Allied Aquacultures, June, 1983. B.S., W. Carolina; M.S., N.C. State; Ph.D., LSU
- ALVORD, BEN FINLEY, Professor Emeritus, Research Data Analysis, June, 1966. B.S., M.S., Illinois
- AMACHER, RICHARD E., Hargis Professor Emeritus, English, March, 1984. A.B., Ohio; Ph.D., Pittsburgh
- AMLING, HARRY J., Professor Emeritus, Horticulture, March, 1987. B.S., Rutgers; M.S., Delaware; Ph.D., Michigan State
- ANTHONY, W. B., Professor Emeritus, Animal and Dairy Science, March, 1980. B.S., Illinois; M.S., Texas A&M; Ph.D., Cornell
- ARANT, F. S., Professor Emeritus, Zoology-Entomol., July, 1975. B.S., M.S., Auburn; Ph.D., Iowa State
- ATTLBERGER, MARIE H., Professor Emerita, Microbiology, October, 1986. D.V.M., M.S., Auburn; Ph.D., Alabama
- AUTREY, K. M., Professor Emeritus, Animal & Dairy Science, July, 1976. B.S., LSU; M.S., Ph.D., Iowa State
- BAGWELL, JAMES E., Associate Professor Emeritus, Geography, June, 1988. B.S., North Carolina
- BAILEY, WILFORD S., President Emeritus & University Professor, December, 1986. D.V.M., M.S., Auburn; Sc.D., Johns Hopkins
- BAKER, J. MARSHALL, Professor Emeritus, Chemistry, June, 1988. B.S., Missouri Valley; M.S., Ohio State; Ph.D., Missouri
- BALL, RICHARD W., Professor Emeritus, Mathematics, September, 1988. B.A., M.A., Ph.D., Illinois
- BARKSDALE, ROBBIE A., Librarian III Emerita, July, 1976. A.B., Montevallo; B.S., M.S., Columbia
- BEARD, G. W., Director Emeritus, Athletics, June, 1972. B.S., Auburn
- BELL, SIDNEY C., Professor Emeritus, Agricultural Economics, October, 1988. B.S., M.S., Auburn; Ph.D., Michigan State; J.D., Jones Law Institute
- BENTLEY, CHARLES A., Associate Professor Emeritus, Music, September, 1976. B.S.M., Baldwin-Wallace; M.A., Professional Diploma, "Specialist in Music Education"; Ed.D., Columbia
- BLAKE, GEORGE H., JR., Professor Emeritus, Zoology-Entomology, June, 1983. B.S., M.S., Auburn; Ph.D., Illinois
- BOSTON, ROBERT O., Associate Professor Emeritus, Economics, September, 1978. B.S., M.S., Alabama
- BRADBERRY, GEORGE L., Executive Director Emeritus, Alumni & Development, September, 1985. B.S., Georgia
- BREYER, BERNARD R., Professor Emeritus, English, September, 1985. B.A., Vanderbilt; M.A., LSU; Ph.D., Virginia
- BRITTIN, NORMAN A., Professor Emeritus, English, June, 1977. A.B., A.M., Syracuse, Ph.D., Washington
- BRITTIN, RUTH LOWE, Associate Professor Emerita, English, December, 1986. B.S., M.A., Auburn
- BROOKS, GEORGE H., Professor Emeritus, Industrial Engr., January, 1981. B.I.E., Florida; M.S.I.E., Ph.D., Georgia Tech
- BROWN, V. LAYRNE, Department Head Emeritus, Research Operations, Agriculture & Biological Sciences & Agricultural Experiment Station, June, 1984. B.S., Mississippi State
- BURNETT, PAUL C., Professor Emeritus, Journalism, June, 1979. B.A., Louisiana Tech; M.A., LSU
- BURNS, MOORE J., Professor Emeritus, Physiology & Pharmacology, March, 1982. B.S., M.S., Auburn; Ph.D., Purdue
- BURTON, LEONARD PATTILLO, Professor Emeritus, Mathematics, June, 1985. A.B., M.A., Alabama; Ph.D., N. Carolina
- BUTZ, ROBERT K., Professor Emeritus, Mathematics-ACA, June, 1988. B.S., Colorado State; M.S., Ph.D., Georgia
- CALLAN, ALLIE WILLIS, JR., Associate Professor Emeritus, Aerospace Engineering, June, 1986. B.S., Maryland; M.S., George Washington
- CANNON, ROBERT Y., Professor Emeritus, Animal & Dairy Sciences, September, 1982. B.S., Iowa State; M.S., Ohio State; Ph.D., Wisconsin
- CANTRELL, CLYDE HULL, Director Emeritus, Libraries, July, 1977. A.B., M.A., A.B.L.S., N. Carolina; Ph.D., Illinois
- CAPPS, JULIUS DANIEL, Professor Emeritus, Chemistry, June, 1974. B.S., M.S., Auburn; Ph.D., Nebraska
- CARGILE, GERTRUDE, Editor Emerita, April, 1984
- CARR, HOWARD E., Professor Emeritus, Physics, January, 1981. B.S., Auburn; M.A., Ph.D., Virginia
- CARTER, MARY F., Professor Emerita, Architecture, June, 1980. A.B., Georgia; M.A., Columbia; Diploma, Parson School of Design
- CHASTAIN, MARIAN F., Associate Professor Emerita, Nutrition & Foods, June, 1986. B.S., Cedar Crest; M.S., Ph.D., FSU
- COOPER, BEN F., Dean Emeritus, Pharmacy, October, 1987. A.B., B.S., M.S., Ph.D., N. Carolina
- COPE, JOHN THOMAS, JR., Professor Emeritus, Agronomy & Soils, November, 1984. B.S., M.S., Auburn; Ph.D., Cornell
- CORLEY, TOM EDWARD, Associate Dean Emeritus & Associate Director Emeritus, Agricultural Experiment Station, October, 1984. B.S., M.S., Auburn
- COSS, ARTHUR F., Professor and Department Head Emeritus, Elementary Ed., October, 1981. B.E., N. Illinois; M.A., Northwestern; Ed.D., Indiana
- COTTER, G. J., Professor Emeritus, Poultry Science, April, 1977. B.S., D.V.M., Auburn; M.A., Missouri
- CURRENT-GARCIA, ALVA, Associate Professor Emerita, Family & Child Development, September, 1978. A.B., Randolph-Macon; M.S., Nebraska
- CURRENT-GARCIA, EUGENE, Hargis Professor Emeritus, English, January, 1979. A.B., M.A., Tulane; A.M., Ph.D., Harvard

- DANNER, MAURICE, *Professor Emeritus*, Ag. Ec. & Rural Soc., November, 1978. B.S., Texas Tech; M.S., Tennessee
- DAVIS, DONALD E., *Professor Emeritus*, Botany, Plant Pathology & Microbiology, April, 1982. B.Ed., Ped.D., E. Illinois; M.S., Ph.D., Ohio State
- DAVIS, W. L., *Professor Emeritus*, Education, July, 1975. B.S., Mid. Tenn. State; M.A., Peabody; Ed.D., Columbia
- DECKER, HAROLD R., *Associate Professor Emeritus*, Aero. Engr., January, 1979. B.S.Ed., NE Missouri State; M. Litt; Pittsburgh
- DENDY, JOHN S., *Professor Emeritus*, Zoology-Entomol. & Fish & Allied Aqua., September, 1978. B.S., Presbyterian; M.A., N. Carolina; Ph.D., Michigan
- DeVALL, WILBUR B., *Professor Emeritus*, Forestry, February, 1978. B.S., New York State Forestry; M.S., Florida
- DIENER, URBAN L., *Professor Emeritus*, Plant Pathology, October, 1987. B.A., Miami-Ohio; M.A., Harvard; Ph.D., N.C. State
- DONNELLY, EDWARD D., *Professor Emeritus*, Agronomy & Soils, January, 1984. B.S., M.S., Auburn; Ph.D., Cornell
- DOUITY, HELEN IRENE, *Associate Professor Emerita*, Consumer Affairs, June, 1986. B.S., M.S., Cornell; Ph.D., FSU
- DUGGER, FOWLER, JR., *Editor Emeritus*, July, 1987. B.A., Alabama; M.A., Duke
- DUMAS, WILLIAM T., *Associate Professor Emeritus*, Agricultural Engineering, October, 1983. B.M., M.S., Auburn
- EDGAR, SAMUEL ALLEN, *Professor Emeritus*, Poultry Science, July, 1986. A.B., Sc.D., Sterling; M.S., Kansas State; Ph.D., Wisconsin
- EDWARDS, CHARLES WESLEY, *Registrar Emeritus*, June, 1966. B.S., Auburn; M.A., Harvard
- ELLISOR, MILDRED R., *Professor Emerita*, Elem. Ed., June, 1978. A.B., Huntington; M.A., Ed.D., Columbia
- ENSMINGER, LEONARD E., *Professor Emeritus*, Ag. & Soils, January, 1979. B.S., Missouri; Ph.D., Illinois
- EVANS, EMERSON M., *Associate Professor Emeritus*, Ag. & Soils, October, 1983. B.S., Auburn; M.S., Cornell
- FEASTER, WILLIAM M., *Professor Emeritus*, Electrical Engineering, October, 1988. B.S.E.E., M.S.E.E., Auburn
- FITZPATRICK, MARY PRESTON, *Associate Professor Emerita*, HPR, July, 1984. B.S., Middle Tennessee; M.A., Ed.D., Peabody
- FITZPATRICK, PHILIP M., *Professor Emeritus*, Mathematics, May, 1982. B.S., M.S., Ph.D., Oklahoma
- FLUKER, BILLIE J., *Associate Professor Emeritus*, Mechanical Engineering, June, 1987. B.S.E.E., M.S.M.E., Texas A&M; Ph.D., Tulane
- FORTENBERRY, CHARLES N., *Professor Emeritus*, Political Science, July, 1979. B.A., M.A., Mississippi; Ph.D., Illinois
- FOURIER, ARTHUR E., *Professor Emeritus*, HPR, November, 1982. B.S., Illinois; M.A., Ph.D., Peabody
- FOY, JAMES E., *Dean Emeritus*, Student Affairs & Professor Emeritus, Counselor Education, April, 1978. A.B., M.A., Alabama; Ph.D., Michigan State
- FRANCIS, WILLIAM HUGH, *Professor Emeritus*, Tech. Svc., June, 1971. B.S., M.S., Auburn
- FUNCHESS, LINWOOD E., *Director Emeritus*, Buildings & Grounds, July, 1977. B.S., Auburn; M.S., Cornell
- GALBRAITH, RUTH L., *Dean Emerita*, Human Sciences & Professor Emerita, Consumer Affairs, September, 1985. B.S., Ph.D., Purdue
- GOGGANS, JAMES FLOYD, *Professor Emeritus*, Forestry, August, 1984. B.S., Georgia; M.F., Duke; Ph.D., N.C. State
- GOODMAN, JOHN G., *Associate Professor Emeritus*, Poultry Science, August, 1973. B.S., M.S., Auburn
- GOODWIN, GEORGE R., *Associate Professor Emeritus*, Management, June, 1979. B.S., Florida; M.S., George Washington
- GRAF, EDWARD R., *Professor Emeritus*, Electrical Engineering, January, 1987. B.E.E., M.E.E., Auburn; Ph.D., Stuttgart, W. Germany
- GREENLEAF, WALTER H., *Professor Emeritus*, Horticulture, February, 1982. B.S., Ph.D., California
- GUERIN, WILLIAM H., *Campus Planner & University Architect Emeritus*, January, 1982. B.Arch., Florida
- HALE, DENNIS P., *Associate Professor Emeritus*, Accounting & Finance, June, 1985. B.S., Mid. Tenn. State; M.A., Peabody
- HALE, FRANCES W., *Associate Professor Emerita*, Vocat. & Adult Ed., June, 1982. B.S., Troy State; M.A., Peabody
- HARRIS, HUBERT, *Associate Professor Emeritus*, Horticulture, March, 1976. B.S., M.S., Auburn
- HARRISON, JOSEPH H., JR., *Professor Emeritus*, History, September, 1988. B.A., M.A., Ph.D., Virginia
- HARTMAN, MAURICE A., *Professor Emeritus*, Accounting & Finance, June, 1981. B.S., High Point; M.S., N. Carolina; M.B.A., Texas
- HARTWIG, CHESTER W., *Professor Emeritus*, Soc. and Anthro., January, 1977. B.S., M.A., Ph.D., Wisconsin
- HAYHURST, DONALD E., *Professor Emeritus*, Political Science, September, 1988. A.B., M.Litt., Ph.D., Pittsburgh
- HAUNES, L. J., *Professor Emeritus*, Tech. Svc., Director Emeritus, Industrial Lab., October, 1978. B.S., M.S., Auburn; Ed.D., Bradley
- HAWKINS, GEORGE E., *Professor Emeritus*, Animal & Dairy Sciences, October, 1982. B.S., W. Kentucky; M.S., Georgia; Ph.D., N.C. State
- HENRY, JOHN F., *Professor Emeritus*, Management, January, 1986. B.I.M., Auburn; M.S.I.M., Ga. Tech; Ph.D., Alabama
- HIERS, CHARLES J., *Professor Emeritus*, Art, June, 1988. B.A.A., M.A.A., Auburn
- HINTON, MARJORIE J., *Associate Professor Emerita*, Family & Child Development, June, 1984. B.S., Alabama; M.S., Auburn
- HINTON, WILBUR, *Professor Emeritus*, Music, July, 1984. B.M., M.A., Ed.D., Alabama
- HOBBS, EDWARD H., *Dean Emeritus*, Arts & Sciences, & Professor Emeritus, Political Science, October, 1986. A.B., N. Carolina; M.A., Alabama; Ph.D., Harvard
- HOBBS, MARLEAH K., *Associate Professor Emerita*, Art, June, 1988. B.F.A., Colorado; M.F.A., Mississippi
- HOCKING, GEORGE M., *Professor Emeritus*, Pharmacy, September, 1975. B.S.P., Washington; M.S.P., Ph.D., Florida
- HODGKINS, EARL, *Professor Emeritus*, Forestry, March, 1978. B.S., Michigan State; M.S., California; Ph.D., Michigan
- HODSON, NORMA G., *Professor Emerita*, Fam. & Child Dev., September, 1976. B.S., Butler; M.S., Ph.D., FSU
- HOFF, EDWIN J., *Associate Professor Emeritus*, Pathology, October, 1983. D.V.M., Cornell; M.S., Pennsylvania
- HOLLOWAY, CLARKE L., *Professor Emeritus*, Anatomy and Histology, July, 1988. D.V.M., M.S., Auburn; Ph.D., Iowa State
- HOLLOWAY, OTTO, *Professor Emeritus*, Found. of Ed., August, 1972. B.S., M.S., Auburn; Ed.D., Columbia
- HONNELL, MARTIAL A., *Professor Emeritus*, Electrical Engr., July, 1981. B.S.E.E., M.S.E.E., E.E., Ga. Tech

- HOOD, JOSEPH T., *Professor Emeritus & Department Head Emeritus, Agronomy & Soils, October, 1986. B.S., Georgia; M.S., Purdue; Ph.D., Cornell*
- HSU, ANDREW C.T., *Professor Emeritus, Chemical Engineering, June, 1986. B.S.C., Nanking; M.S., Wisconsin; Ph.D., Pennsylvania*
- HUDSON, FRED M., *Professor Emeritus, Civil Engr., December, 1980. B.S.C.E., Purdue; M.S., Princeton*
- HUDSON, ROBERT S., *Alumni Professor Emeritus, Large Animal Surgery and Medicine, June, 1988. D.V.M., Oklahoma State; M.S., Auburn*
- HUDSON, SARA A., *Associate Professor Emerita, English, September, 1986. A.B., N. Carolina; M.A., Ph.D., Chicago*
- HUGHES, GORDON, *Professor Emeritus, Physics, June, 1970. B.A., Oberlin; M.A., Ph.D., Illinois*
- IKENBERRY, ERNEST, *Professor Emeritus, Mathematics, June, 1975. B.A., Ottawa; M.S., Kansas; Ph.D., LSU*
- IRVINE, LAVERNE F., *Associate Professor Emeritus, Psychology, September, 1986. B.M., B.A., Louisiana Tech; M.A., Ph.D., Stanford*
- IVEY, WILLIAM D., *Associate Professor Emeritus, Zoology-Entomology, September, 1985. B.S., M.S., Auburn; Ph.D., Emory*
- JOHNSON, EVERT W., *Professor Emeritus, Forestry, July, 1986. B.S., New Hampshire; M.F., Yale; Ph.D., Syracuse*
- JOHNSON, W. A., *Associate Professor Emeritus, Horticulture, January, 1975. B.S., M.S., Auburn*
- JONES, MADISON P., *Professor Emeritus, English, & University Writer-in-Residence Emeritus, June, 1987. A.B., Vanderbilt; M.A., Florida*
- JUSTICE, ERNEST, *Associate Professor Emeritus, Curriculum and Teaching, April, 1983. B.M.E., Kansas STC; M.S., Ph.D., Wisconsin*
- KERN, EDWARD E., JR., *Professor Emeritus, Economics, January, 1988. B.S., M.S., LSU; Ph.D., Kentucky*
- KINCEY, TRULY E., *Professor Emerita, Economics, September, 1979. A.B., Montevallo; M.A., Tulane; Ph.D., Ohio State*
- KING, CHARLES COOPER, JR., *Professor Emeritus, Agronomy & Soils, October, 1986. B.S., M.S., Auburn; Ph.D., N.C. State*
- KING, NELSON B., *Associate Dean Emeritus, Vet. Med., November, 1980. B.Sc., D.V.M., M.Sc., Ph.D., Ohio State*
- KLONTZ, HAROLD E., *Professor Emeritus, Economics, June, 1979. A.B., Berea; Ph.D., N. Carolina*
- KRIBS, ANNA E., *Librarian III Emerita, September, 1976. A.B., Louisiana Tech; M.S.L.S., LSU*
- KUDERNA, JEROME, *Professor Emeritus, Education, June, 1962. B.S., M.A., Michigan State*
- LAND, JAMES E., *Professor Emeritus, Chemistry, June, 1975. B.S., Clemson; M.S., Tulane; Ph.D., N. Carolina*
- LAND, JEANNETTA T., *Professor Emerita HPR, September, 1974. B.S., Alabama; M.A., Columbia*
- LAWRENCE, JOHN M., *Professor Emeritus, Fisheries & Allied Aquacultures, December, 1981. B.S., M.S., Auburn; Ph.D., Iowa State*
- LAYFIELD, MARY A., *Associate Professor Emerita, Family & Child Development, June, 1986. B.S., M.S., M.S.Ed., Ed.D., Auburn*
- LITTLE, ALTON S., *Associate Professor Emeritus, Tech. Svc., July, 1977. B.C.E., Auburn; M.S.C.E., Georgia Tech*
- LIVERMAN, JOHN HUBERT, *Professor Emeritus, Music, June, 1980. B.S., M.A., Columbia*
- LIVINGSTON, KNOX, *Associate Professor Emeritus, Forestry, January, 1978. B.S., S. Carolina; M.F., Duke*
- LORENDO, JANE C., *Associate Professor Emerita, Consumer Affairs, June, 1983. B.S., Minnesota; M.S., Auburn*
- LYLE, EVERETT SAMUEL, JR., *Associate Professor Emeritus, Forestry, January, 1986. B.S., Georgia; M.F., Duke; Ph.D., Auburn*
- LYLE, JAMES A., *Professor Emeritus, Bot. & Microb., October, 1979. B.S., Kentucky; M.S., N.C. State; Ph.D., Minnesota*
- MAEHL, WILLIAM H., *Professor Emeritus, History, June, 1981. B.Sc., M.A., Northwestern; Ph.D., Chicago*
- MARSHALL, NORTON L., *Professor Emeritus, Botany and Microbiology, June, 1988. B.S., Penn State; M.S., Ph.D., Maryland*
- MARTIN, FRED W., *Professor Emeritus, Aerospace Engineering, September, 1985. B.S.A.E., M.S., Ph.D., Va. Tech*
- MARTIN, JOHN S., *Associate Professor Emeritus, Educational Leadership, December, 1988. B.S., Ed.D., Auburn; M.A., Alabama*
- MARTY, EDWARD C., *Professor Emeritus, Building Technology, June, 1972. B. Arch., M Arch., Auburn*
- MCLEOD, FRANCES R., *Associate Professor Emerita, English, July, 1975. A.B., Huntingdon; M.S., Auburn*
- McMILLAN, M. C., *Hollifield Professor Emeritus, History, January, 1978. A.B., M.A., Alabama; Ph.D., N. Carolina*
- MERRITT, CLEMENTS B., *Associate Professor Emeritus, Aerospace Engineering, September, 1988. B.M.E., Florida; M.S.A.E., Air Force Inst. Tech*
- MILLER, THOMAS E., *Associate Professor Emeritus, Educational Media, June, 1987. B.S., Berry; M.S., Stout State; Ed.D., Indiana*
- MONTGOMERY, ROBERT W., *Professor Emeritus, Voc. & Adult Ed., July, 1980. B.S., M.S., Auburn; Ph.D., Ohio State*
- MOORE, E. B., JR., *Professor Emeritus, Ed. Administration, September, 1978. A.B., M.B.A., Syracuse; Ed.D., Florida*
- MOORE, OMAR C., *Associate Professor Emeritus, Chemical Engr., September, 1969. B.S., M.S., Auburn*
- MORGAN, ALICE S., *Associate Professor Emerita, Voc. & Adult Ed., December, 1986. B.S., S. Miss.; M.A., Alabama; Ed.D., Auburn*
- MORGAN, LAURENCE S., *Associate Professor Emeritus, Music, June, 1985. B.M., Alabama; M.A., Columbia*
- MORGAN, WILLIAM W., *Professor Emeritus, Industrial Engineering, January, 1982. B.B.A., Georgia; M.S., Ga. Tech*
- MOUNT, ROBERT H., *Professor Emeritus, Zoology & Entomology, September, 1986. B.S., M.S., Auburn; Ph.D., Florida*
- MYLES, WILLIAM R., *Associate Professor Emeritus, Management, September, 1977. B.S., M.A., Pittsburgh*
- NEAL, JAMES E., *Professor Emeritus, Microbiology, December, 1971. B.S., Miss. State; D.V.M., Auburn; M.S., Texas A&M*
- NEAL, JESSE H., *Professor Emeritus, Ag. Engr., August, 1967. B.S., Kansas State; M.S., Minnesota; Ph.D., Missouri*
- NEWTON, WESLEY P., *Professor Emeritus, History, September, 1987. A.B., Missouri; M.A., Ph.D., Alabama*
- NICHOLS, GROVER TYLER, *Associate Professor Emeritus, Elect. Engr., December, 1973. B.E.E., Auburn; M.S., Ga. Tech*
- ORR, HENRY P., *Professor Emeritus, Horticulture, September, 1981. B.S., Auburn; M.S., Ph.D., Ohio State*
- OTTIS, KENNETH, *Professor Emeritus, Zoo-Enomal., June, 1973. B.S., Dakota Wesleyan; M.S., Ph.D., Iowa State*
- PATTERSON, RICHARD M., *Professor Emeritus, Bot., Pl. Path. and Microbiol., April, 1985. B.S., M.S., Florida; Ph.D., Penn. State*

- PATTERSON, TROY B., JR., *Professor Emeritus, Animal & Dairy Science, March, 1986. B.S., Miss. State; M.S., Ph.D., Texas A&M*
- PEAK, J. HUNTER, *Professor Emeritus, Foreign Languages, June, 1984. A.B., Hampden-Sydney; M.A., Ph.D., N. Carolina*
- PEARSON, ALLEN M., *Professor Emeritus, Zoo-Entomol., December, 1971. B.S., Auburn; M.S., Ph.D., Iowa State*
- PEET, HELEN H., *Librarian III Emerita, July, 1976. B.A., Mississippi Woman's College; M.A., Tulane*
- PERKINS, DONALD Y., *Professor Emeritus, Department Head Emeritus, Horticulture, January, 1986. B.S., M.S., LSU; Ph.D., Cornell*
- PERRY, FREDERICK B., JR., *Associate Professor Emeritus, Horticulture, May, 1988. B.S., M.S., Auburn; Ph.D., Georgia*
- PERRY, NORMAN, *Professor Emeritus, Mathematics, September, 1977. A.B., California; M.A., Ph.D., Georgia*
- PERSONS, CAROLINE C., *Librarian III Emerita, July, 1981. A.B., Miss. U. for Women; B.S.L.S., Peabody*
- PETERSON, JOSEPH G., *Associate Professor Emeritus, Chemistry, July, 1981. B.S., M.S., Auburn*
- PFEL, EVA, *Professor Emerita, Industrial Design, June, 1988. B.I.D., M.V.C., Ulm Graduate School of Design; Certificate Psychology, Zurich; Ph.D., Walden*
- PHILLIPS, CHARLES L., *Professor Emeritus, Electrical Engineering, October, 1987. B.E.E., M.S.E.E., Ph.D., Ga. Tech*
- PHILLIPS, PHYLLIS P., *Associate Professor Emerita, Speech Pathology, June, 1983. B.S., M.Ed., Ed.D., Auburn*
- PHILLIPS, RAY C., *Professor Emeritus, Ed. Ldrshp., October, 1982. B.S., Mid. Tenn.; M.A., Peabody; Ed.D., Auburn*
- PHILPOTT, HARRY M., *President Emeritus, June, 1980. A.B., Washington & Lee; Ph.D., Yale; D.D. (Hon.), Stetson; LL.D. (Hon.), Washington and Lee; LL.D. (Hon.), Florida; LL.D. (Hon.), Alabama; H.H.D. (Hon.) Samford; L.H.D. (Hon.), Auburn*
- PITTS, ROBERT G., *Professor Emeritus, Aero. Engr., July, 1979. B.A.E., Auburn; M.S., California Tech*
- POSNIK, ALEXANDER R., *Associate Professor Emeritus, Foreign Languages, September, 1981. B.A., Maryland; M.S., George Washington*
- PRATHER, EDMUND E., *Associate Professor Emeritus, Fisheries and Allied Aquacultures, January, 1984. B.S., Auburn; M.S., Michigan*
- PUMPHREY, FRED H., *Dean Emeritus, Engineering, June, 1969. B.S., B.E.E., E.E., D.Sc., (Hon.), Ohio State*
- PUNKE, HAROLD H., *Professor Emeritus, Foundations of Ed., June, 1971. B.S., M.S., Illinois; Ph.D., Chicago*
- PURCELL, MARY LOU G., *Professor Emerita, Family and Child Development, September, 1988. B.A., Yankton; M.A., Ed.D., Columbia*
- RASH, JOE M., *Associate Professor Emeritus, Pharmacy, January, 1975. B.S., Carson-Newman; M.S., Auburn*
- REAGAN, HUGH D., *Associate Professor Emeritus, History, June, 1980. B.A., M.A., Emory; Ph.D., Texas*
- REDDING, RICHARD W., *Professor Emeritus, Physiology and Pharmacology, May, 1985. D.V.M., M.Sc., Ph.D., Ohio State*
- RENOLL, ELMO S., *Professor Emeritus, Agricultural Engineering, October, 1982. B.S., Auburn; M.S., Iowa State*
- RITLAND, RAYMOND W., *Professor Emeritus, Economics, June, 1972. B.S.C., M.A., Ph.D., Iowa*
- ROBERTS, CHARLES S., *Professor Emeritus, Path. and Parasit., August, 1977. D.V.M., Auburn; M.S., Michigan State*
- ROBERTSON, FRED R., *Vice President Emeritus, Extension and Professor Emeritus, Political Science, June, 1978. B.S., M.S., Tennessee; Dr.P.A., Harvard*
- ROGERS, CHARLES M., *Associate Professor Emeritus, Psychology, September, 1985. B.A., Lafayette; Ph.D., Yale*
- ROGERS, HOWARD T., *Professor Emeritus, Agronomy and Soils, April, 1976. B.S., Va. Tech; M.S., Michigan State; Ph.D., Iowa State*
- ROLLINGS, GILBERT H., *Associate Professor Emeritus, Animal & Dairy Sciences, July, 1981. B.S., M.S., Va. Tech; Ph.D., Illinois*
- ROLLO, CHARLES A., *Associate Professor Emeritus, Agricultural Engr., August, 1978. B.S., M.S., Auburn*
- ROUSE, R. DENNIS, *Dean Emeritus, Agriculture, Forestry & Biological Sciences & Director Emeritus, Alabama Ag. Experiment Station, September, 1981. B.S., M.S., Georgia; Ph.D., Purdue*
- RUSSELL, DALLAS W., *Professor Emeritus, Electrical Engineering, October, 1987. B.S.E.E., M.S., Tennessee; Ph.D., Florida*
- RYMAL, KENNETH S., *Professor Emeritus, Horticulture, December, 1987. B.S., MIT; M.S., Florida; Ph.D., Georgia*
- SANDERS, JAMES W., *Associate Professor Emeritus, Speech Communication, June, 1985. B.A., Tampa; B.A., M.A., Florida*
- SARVER, JOSEPH B., *Executive Secretary Emeritus, the Alumni Association & Director Emeritus of the Auburn Development Program, November, 1976. B.S., Auburn*
- SCARBOROUGH, C. CAYCE, *Professor Emeritus, Vocational & Adult Education, September, 1979. B.S., M.S., Auburn; Ed.D., Illinois*
- SCARBOROUGH, JOHN L., *Associate Professor Emeritus, Mechanical Engineering, January, 1985. B.S.A.E., M.S.M.E., Auburn; M.S., Alabama*
- SCARSBROOK, CLARENCE E., *Professor Emeritus, Agronomy & Soils, October, 1978. B.S., Auburn; Ph.D., N. Carolina State*
- SCHELL, FRED G., *Professor Emeritus, L. An. Surg. and Med., February, 1974. D.V.M., Auburn*
- SELF, RAYMOND L., *Professor Emeritus, Plant Pathology, April, 1981. B.S., M.S., Auburn; Ph.D., Wisconsin*
- SFORZINI, RICHARD H., *Professor Emeritus, Aerospace Engineering, July, 1985. B.S., U.S. Military Academy; M.E., MIT*
- SHERLING, WILLIAM G., *Associate Professor Emeritus, Aero. Engr., October, 1980. B.A.E., Auburn; M.S.A.E., Georgia Tech*
- SIMMONS, CHARLES F., *Dean Emeritus, Agriculture & Assistant Director Emeritus, Agricultural Experiment Station, June, 1980. B.S., M.S., Auburn, Ph.D., Ohio State*
- SMITH, FLOYD S., *Associate Professor Emeritus, Mech. Engr., September, 1981. B.S.Ch.E., B.S.M.E., M.S.Ch.E., Auburn*
- SMITH, WILLIAM S., *Professor Emeritus, Speech Comm., September, 1977. B.Ed., N. Illinois; M.A., Ph.D., Stanford*
- SNOW, SAMUEL P., *Professor Emeritus, Architecture, September, 1981. B.S., B.L.A., M.S., Massachusetts; M.L.A., Harvard*
- SPANN, RANSOM D., *Professor Emeritus, Electrical Engr., June, 1964. B.S.E.E., E.E., Auburn*
- SPEER, WILLIAM A., *Professor Emeritus, Architecture, June, 1980. B.S. Arch, Clemson, M.Arch., Rensselaer Tech*
- STALNAKER, CARROLL C., *Associate Professor Emeritus, Acct. and Finance, September, 1973. B.A., Iowa State; M.A., Iowa*

- STEELE, H. ELLSWORTH, *Professor Emeritus, Economics*, April, 1982. B.A., M.A., Nebraska; Ph.D., Ohio State
- STEVENS, FRANK J., *Professor Emeritus, Chemistry*, June, 1984. B.S., Illinois; Ph.D., Iowa State
- STOKES, CHARLIE MACK, *Associate Professor Emeritus, Agricultural Engr.*, March, 1980. B.S., M.S., Auburn
- STROUD, OXFORD, *Associate Professor Emeritus, English*, September, 1983. B.S., M.A., Auburn
- SYKES, MALTBY, *Professor Emeritus, Art*, June, 1977. Studied with Wyman Adams, Diego Riviera, John Sloan, George C. Miller, Fernand Leger, Stanley William Hayter, and Andre Lhote
- THOMPSON, SIDNEY LEE, *Associate Professor Emeritus, Mathematics*, June, 1976. B.S., Birmingham-Southern; M.S., Tulane; M.A., Michigan
- TINCHER, WILBUR A., JR., *Professor Emeritus, Educational Leadership*, September, 1987. A.B., M.A., Ed.D., Kentucky
- TRUCKS, LOUIS B., *Associate Professor Emeritus, Industrial Engineering*, January 1983. B.S., Auburn; M.S., Pittsburgh; Ph.D., Oklahoma State
- TUCKER, HOWARD F., *Associate Professor Emeritus, An. & Dairy Sci.*, October, 1981. B.S., M.S., Ph.D., Auburn
- TURNER, LOUISE K., *Associate Professor Emerita, HPR*, September, 1975. B.A., SW University; M.A., M.S., LSU; Ph.D., New York
- TURK, ELIZABETH S., *Librarian III Emerita*, December, 1987. B.A., Tulane; M.Ed., Auburn
- TURNER, DEWEY M., *Associate Professor Emeritus, An. and Dairy Sci.*, December, 1972. B.S., Auburn; M.S., Illinois
- UMBACH, A. W., *Professor and Wrestling Coach Emeritus*, August, 1973. B.S., SW State Teachers; M.A., Colorado State Education
- VALLERY, GEORGIA G., *Associate Professor Emerita, Psychology*, September, 1982. B.S., M.A., LSU; M.S., Auburn
- VALLERY, H. F., *Assistant to the President Emeritus*, July, 1979. B.A., M.A., LSU; M.A., Ed.D., Columbia
- VANDEGRIFT, FRANK, *Director Emeritus, Cooperative Education*, January, 1985. B.M.E., Georgia Tech; M.A., Columbia Theological Seminary
- VAN DE MARK, MILDRED S., *Professor Emerita, Human Sciences*, March, 1973. B.S., Auburn; M.S., Columbia
- VIVES, DONALD L., *Professor Emeritus, Chemical Engineering*, June, 1987. B.S., M.S., Columbia
- WALKER, DONALD F., *Professor Emeritus, Large Animal Surgery and Medicine*, October, 1988. D.V.M., Colorado State
- WALKIN, JACOB, *Professor Emeritus, Political Science*, September, 1982. A.B., Cornell; M.A., Yale; Ph.D., California
- WARD, BENJAMIN P., *Associate Professor Emeritus, Mech. Engr.*, July, 1968. B.S., U.S. Naval Academy; M.S.M.E., Columbia
- WARNER, JOHN E., *Librarian III, Emeritus*, January, 1983. B.S., B.S.L.S. State University of New York, Albany; M.A., Ed.D., Columbia
- WARREN, W. M., *Professor Emeritus, An. and Dairy Sci.*, September, 1980. B.S., Michigan State; M.S., Texas A&M; Ph.D., Missouri
- WATERS, WILLIAM T., *Professor Emeritus, Textile Engineering*, July, 1986. B.S.T.E., Clemson; M.S., Institute of Textile Tech
- WHEATLEY, WALTER B., *Associate Professor Emeritus, Chemistry*, June, 1982. B.S., Birmingham-Southern; M.T. (ASCP), Lloyd Noland Foundation; M.S., Auburn
- WHITE, MORRIS, *Professor Emeritus, Agricultural Economics & Rural Sociology*, January, 1983. B.S., Auburn; M.S., Ph.D., Purdue
- WIGGINS, AGEE M., *Professor Emeritus, Large Animal Surgery and Medicine*, January, 1989. D.V.M., Auburn; M.S., Kansas State
- WIGGINS, EARL L., *Professor Emeritus, An. & Dairy Sci.*, August, 1981. B.S., M.S., Oklahoma State; Ph.D., Wisconsin
- WILBANKS, MARY ELIZABETH, *Librarian III, Emerita*, May, 1985. A.B., Montevallo; M.A., Emory; M.S.L.S., N. Carolina
- WILLIAMS, BYRON B., JR., *Professor Emeritus, Pharmacology-Toxicology*, August, 1981. B.S., M.S., Ph.D., Florida
- WILLIAMS, ELIZABETH G., *Associate Professor Emerita, Accountancy*, June, 1987. B.S., M.S., Auburn
- WILLIAMS, ERNEST, *Professor Emeritus, Mathematics*, June, 1976. B.S., Birmingham-Southern; M.S., Auburn; Ph.D., Michigan
- WILLIAMS, L.B., *Editor Emeritus, University Relations*, June, 1988. B.S., Troy State; M.S., Peabody
- WILLIAMSON, EDWARD C., *Professor Emeritus, History*, June, 1983. A.B., M.A., Florida; Ph.D., Pennsylvania
- WINKLER, JOHN K., *Associate Professor Emeritus, L. An. Surg. and Med.*, June, 1983. D.V.M., Colorado State
- ZIEGLER, PAUL F., *Associate Professor Emeritus, Chemistry*, July, 1982. B.S., Otterbein; M.S., Ph.D., Cincinnati

State Regulatory and Veterinary Services State Regulatory Service

CHEMISTRY

State Chemical Laboratory

JINKS, JOHN D., *Director*, 1968. B.S., Auburn
HAYES, ROSE MAE, *Chemist II*, 1967, 1973. B.S., N. Alabama
OWEN, MARGIE E., *Chemist II*, 1972. B.S., M.A., N. Alabama
CARMICHAEL, JOE G., *Chemist II*, 1980. B.S., Troy State
DUNCAN, JUDITH, C., *Chemist I*, 1984. B.S., Philippines, M.S., Michigan
THORNTON, ADRIAN, *Chemist II*, 1980. B.S., Tuskegee Institute
BOULWARE, PAUL, *Chemist II*, 1970. B.S., M.S., Auburn
ADCOCK, BOBBY W., *Chemist II*, 1975. B.S., Auburn
ELSTON, PRISCILLA ANN, *Laboratory Technician II*, 1985. B.S., Jacksonville State
ANDREWS, DEFOREST WILLIAM, *Chemist I*, 1976. B.S., Jacksonville State

C.S. Roberts Veterinary Diagnostic Laboratory

*(Conducted in cooperation with the Alabama Department of Agriculture and Industries
and
The United States Department of Agriculture,
Agricultural Research Service.)*

VAUGHAN, JOHN T., *Dean (School of Veterinary Med.)*, 1974, 1977. D.V.M., M.S., Auburn
ALLEY, J. LEE, *State Veterinarian*, 1977. D.V.M., Auburn
HOERR, FRED, *Director, State Diagnostic Laboratory*, 1987. D.V.M., Ph.D., Purdue
MITCHELL, FRANK, *Veterinary Pathologist*, D.V.M., Georgia; M.S., Iowa State
D'ANDREA, GEORGE, *Diagnostic Specialist*, D.V.M., M.S., Auburn
LAUERMAN, LLOYD, *Diagnostic Specialist*. D.V.M., Washington State; Ph.D., Wisconsin

Agricultural Experiment Station Staff

MARTIN, JAMES E., *President*, B.S., Auburn; M.S., N. Carolina State; Ph.D., Iowa State
 PARKS, PAUL F., *Vice President for Research*, B.S., M.S., Auburn; Ph.D., Texas A&M
 FROBISH, LOWELL T., *Director*, B.S., Illinois; M.S., Ph.D., Iowa State
 TEEM, DAVID H., *Associate Director*, B.S., M.S., Ph.D., Auburn
 BRUCE, CHARLES W., *Assistant Director*, B.S., N. Alabama; M.S., Auburn
 ROUSE, R. DENNIS, *Director Emeritus, Agricultural Experiment Station*, B.S., M.S.,
 Georgia; Ph.D., Purdue
 CORLEY, TOM E., *Associate Dean & Associate Director Emeritus, Agricultural
 Experiment Station*, B.S., M.S., Auburn

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

YEAGER, J. H., *Professor & Head*, 1951, 1964. B.S., M.S., Auburn; Ph.D., Purdue
 ADRIAN, JOHN L., JR., *Professor*, 1974, 1984. B.A.A., M.S., Auburn; Ph.D., Tennessee
 CLONTS, HOWARD A., JR., *Professor*, 1962, 1980. B.S., M.S., Auburn; Ph.D., Va. Tech
 DUNKELBERGER, J. E., *Professor*, 1962, 1982. A.B., Franklin and Marshall; M.S., Penn. State; Ph.D., Miss. State
 HARDY, WILLIAM E., JR., *Professor*, 1972, 1983. B.S., M.S., Ph.D., Va. Tech
 MARTIN, NEIL R., JR., *Professor*, 1977, 1984. B.S., M.S., Auburn; Ph.D., Illinois
 MOLNAR, JOSEPH J., *Professor*, 1976, 1986. B.A., M.A., Kent State; Ph.D., Iowa State
 TAYLOR, C. ROBERT, *Professor*, 1987. B.S., Oklahoma State; M.S., Kansas State; Ph.D., Missouri
 ADAMS, MURRAY, JR., *Associate Professor (Soc. & Anthro.)*, 1964, 1970. B.A., M.A., Mississippi; Ph.D., Kentucky
 STALLINGS, JAMES L., *Associate Professor*, 1969. B.S., M.S., Purdue; Ph.D., Michigan State
 BAILEY, L. C., *Assistant Professor*, 1985. B.Sc., Southern Oregon; M.A., Ohio; Ph.D., Cornell
 DUFFY, P. A., *Assistant Professor*, 1985. B.A., Boston College; Ph.D., Texas A & M
 HATCH, L. UPTON, *Associate Professor*, 1982. B.A., Dartmouth; M.S. Georgia; Ph.D., Minnesota
 JOLLY, C. M., *Assistant Professor*, 1980. B.S., Tuskegee; M.S., Auburn; Ph.D., LSU
 KINNUCAN, HENRY W., *Associate Professor*, 1983. B.S., Illinois; M.S., Ph.D., Minnesota
 KOLAJO, EBENEZER F., *Research Associate*, 1987. B.S., Tuskegee; M.S., Ph.D., Auburn
 BARNES, T. A., *Research Associate*, 1980. B.S., Auburn
 CACHO, OSCAR J., *Research Associate*, 1988. B.S., Universidad Autonomis Metropolitana; M.S., Auburn
 PEEL, DERRELL S., *Research Associate*, 1988. B.S., M.S., Montana State
 NOVAK, JAMES L., *Micro. App. Spec.*, 1985. B.S., M.S., New Hampshire; Ph.D., Clemson
 SMUTKO, STEVEN L., *Research Associate*, 1988. B.S., Colorado State; M.C.R.D., N. Dakota State
 ZIDAK, WALTER E., *Research Associate*, 1988. B.S., M.S., Montana State

AGRICULTURAL ENGINEERING

TURNQUIST, P. K., *Professor & Head*, 1977. B.S., Kansas State; M.S., Ph.D., Oklahoma State
 JOHNSON, C. E., *Professor*, 1979. B.S., Oklahoma State; M.S., Ph.D., Iowa State
 HILL, D. T., *Alumni Professor*, 1979. B.S., M.S., Georgia; Ph.D., Clemson
 FLOOD, C. A., JR., *Associate Professor*, 1971, 1979. B.S., Florida; M.S., Kentucky; Ph.D., Purdue
 KOON, JOE L., *Associate Professor*, 1967, 1975. B.S., M.S., Ph.D., Auburn
 ROCHESTER, E. W., JR., *Associate Professor*, 1970, 1978. B.S., Clemson; M.S., Ph.D., N. C. State
 YOO, K. H., *Assistant Professor*, 1983. B.S., Seoul; M.S., Ph.D., Idaho
 TICE, E. M., *Research Associate*, 1983. B.S., M.S., Penn. State
 TRUMBULL, R. D., *Research Associate*, 1984. B.S., M.S., Nebraska
 WOOD, R. K., *Research Associate*, 1984. B.S., M.S., Kentucky
 BAILEY, A. C., *Agricultural Engineer (Coop. USDA)*, 1965. B.S., Michigan State; M.S., Illinois; Ph.D., Auburn
 BURT, EDDIE C., *Agricultural Engineer (Coop. USDA)*, 1968. B.S., Georgia; Ph.D., Auburn
 SCHAFER, R. L., *Agricultural Engineer (Coop. USDA)*, 1964. B.S., M.S., Ph.D., Iowa State
 TAYLOR, J. H., *Agricultural Engineer (Coop. USDA)*, 1962, 1964. B.S., Miss. State; Ph.D., Auburn
 KUTZ, L. J., *Agricultural Engineer*, 1986. B.S., Wisconsin; M.S., Ph.D., Purdue
 MONROE, G. E., *Agricultural Engineer (Coop. USDA)*, 1985. B.S., Michigan State; M.S., Hawaii
 WASHINGTON, B. H., *Agricultural Engineer (Coop. USDA)*, 1985. B.S., Auburn University
 BLOCK, W. L., *Research Associate*, 1987. B.S., M.S., Florida
 RAPER, R. L., *(Coop. USDA)*, 1987. B.S., Miss. State; M.S., Ph.D., Iowa State

*Joint appointment in Department of Agricultural Economics & Rural Sociology

AGRONOMY AND SOILS

- CHAPMAN, LOUIE J., *Acting Head*, 1967, 1986. B.S., M.S. Auburn; Ph.D., Florida
- DANE, JACOB, *Professor*, 1976, 1987. B.S., State Agricultural, Wageningen, The Netherlands; M.Sc., New Mexico State; Ph.D., Colorado State
- DICKENS, RAY, *Professor*, 1965, 1973. B.S., Arkansas; M.S., Ph.D., Auburn
- EVANS, C. E., *Professor*, 1955, 1984. B.S., Abilene Christian; M.S., Auburn; Ph.D., N. C. State
- HAJEK, B. F., *Professor*, 1968, 1978. B.S., Texas A&M; Ph.D., Auburn
- HILTBOLD, A. E., *Professor*, 1955, 1968. B.S., M.S., Wisconsin; Ph.D., Florida
- JOHNSON, WILEY C., JR., *Professor*, 1957, 1969. B.S., Wake Forest; B.S., M.S., N. C. State; Ph.D., Cornell
- ROGERS, HUGO H., *Adjunct Professor (Coop. USDA)*, 1984, 1987. B.S., M.S., Auburn; Ph.D., N. Carolina
- TOUCHTON, J. T., *Professor*, 1980. B.S., M.S., Georgia; Ph.D., Illinois
- WARD, C. Y., *Professor*, 1979. B.S., M.S., Texas Tech; Ph.D., Va. Tech
- EDWARDS, JAMES H., *Adjunct Associate Professor (Coop. USDA)*, 1982. B.S., M.S., Georgia; Ph.D., N. C. State
- ELKINS, C. B., *Adjunct Associate Professor (Coop. USDA)*, 1972, 1976. B.S., M.S., Georgia
- ODOM, J. W., *Associate Professor*, 1977, 1984. B.S., M.A., Tennessee; Ph.D., Purdue
- THURLOW, D. L., *Associate Professor*, 1967. B.S., M.S., Kansas State; Ph.D., Michigan State
- WALKER, R. H., *Associate Professor*, 1978, 1980. B.S., M.S., Ph.D., Miss. State
- BRANSBY, DAVID I., *Associate Professor*, 1987. B.S., Natal (S.A.); M.S., Missouri; Ph.D., Natal (S.A.)
- WEAVER, D. B., *Associate Professor*, 1981, 1987. B.S.A., M.S., Georgia; Ph.D., Purdue
- WEHTJE, G. R., *Associate Professor*, 1981, 1987. B.S., Wash. State; M.S., N. Dakota State; Ph.D., Nebraska
- ADAMS, J. E., *Assistant Professor*, 1985. B.S., M.S., Auburn; Ph.D., Kansas State
- MILLER, J. W., *Assistant Professor*, 1985. B.A., California State; M.S., Florida; Ph.D., Ohio State
- MITCHELL, CHARLES C., *Assistant Professor*, 1984. B.S., Birmingham Southern; M.S., Auburn; Ph.D., Florida
- MOSJIDIS, J. A., *Assistant Professor*, 1985. Agron Degree, Univ. of Chile; Ph.D., California
- MULLINS, G. L., *Assistant Professor*, 1985. B.S. Berea; M.S., Va. Tech; Ph.D., Purdue
- PATTERSON, M. G., *Assistant Professor*, 1985. B.S., M.S., Ph.D., Auburn
- VAN SANTEN, EDZARD, *Assistant Professor*, 1988. Ph.D., Wisconsin-Madison
- DUFFIELD, ROBERT R., *Superintendent, E.V. Smith Research Center*, 1987. B.S., Auburn
- AKRIDGE, RONALD L., *Research Associate*, 1986. B.S., Auburn
- BENHAM, ELLIS C., *Research Associate*, 1984. M.S., Missouri
- BURMESTER, C. H., *Agronomist*, 1980, 1987. B.S., M.S., Auburn
- BURROWS, DAVID C., *Research Associate*, 1986. B.S., Auburn
- HARTZOG, DALLAS, *Agronomist-Peanuts (Headland)*, 1969, 1976. B.S., M.S., Auburn
- HICKS, T. V., *Research Associate*, 1985. B.S., M.S., Texas Tech
- McCORMICK, ROBERT F., JR., *Superintendent, Seed Technology Center*, 1966. B.S., Miss. State
- KEE, DAVID, *Research Associate*, 1983. B.S., M.S., Texas A&M
- TURNER, DAVID L., *Research Associate*, 1982. B.S., Auburn; M.S., Auburn
- BALCH, G. TALMADGE, *Pesticide Ed. Specialist*, 1957. B.S., M.S., Auburn; J.D., Jones Law School

ANIMAL AND DAIRY SCIENCES

- MARPLE, D. N., *Professor & Head*, 1973, 1988. B.S., M.S., Iowa State; Ph.D., Purdue
- DARON, HARLOW H., *Professor*, 1967, 1982. B.S., Oklahoma; Ph.D., Illinois
- HARRIS, RALPH R., *Professor*, 1955, 1974. B.S., M.S., Auburn; Ph.D., Texas A&M
- HUFFMAN, DALE L., *Professor*, 1963, 1973. B.S., Cornell; M.S., Ph.D., Florida
- KUHLERS, DARYL L., *Professor*, 1978, 1984. B.S., Iowa State; M.S., Ph.D., Wisconsin
- McCASKEY, THOMAS A., *Professor*, 1967, 1982. B.S., Ohio; M.S., Ph.D., Purdue
- MOSS, B. R., *Professor*, 1983. Ph.D., Tennessee
- PARKS, PAUL F., *Professor and Vice President for Research*, 1956, 1974. B.S., M.S., Auburn; Ph.D., Texas A&M
- SMITH, R. C., *Professor*, 1961, 1969. B.S., Elmhurst; M.S., Ph.D., Illinois College of Medicine
- STRENGTH, D. R., *Professor*, 1961, 1967. B.S., M.S., Auburn; Ph.D., Cornell
- CUMMINS, K. A., *Associate Professor*, 1980, 1986. B.S., M.S., Washington State; Ph.D., Va. Tech
- JONES, WILLIAM R., *Associate Professor*, 1975, 1983. B.S., Miss. State; M.S., Ph.D., Va. Tech
- SCHMIDT, STEPHEN P., *Associate Professor*, 1976, 1983. B.S., Idaho; M.S., Ph.D., Wisconsin
- BARTOL, F. F., *Associate Professor*, 1983. B.S., Va. Tech; M.S., Ph.D., Florida
- BURNELL, THOMAS W., *Assistant Professor*, 1988. B.S., M.S., Nebraska; Ph.D., Kentucky
- COLORADO, DALE, *Assistant Professor*, 1984. B.S., Colorado State; M.S., Ph.D., W. Virginia
- HOUGH, JOHN, *Assistant Professor*, 1987. B.S., Iowa State; M.S., Ph.D., Georgia
- MULVANEY, DONALD, *Assistant Professor*, 1983. A.S., LLCC, Springfield (Ill.); M.S., Ph.D., Michigan State
- RAHE, C. H., *Associate Professor*, 1980. B.S., Tarleton State; M.S., Ph.D., Texas A&M
- RUSSELL, R., *Assistant Professor*, 1982. B.S., Delaware Valley; M.S., N. C. State; Ph.D., Iowa State
- TROUT, GRAHAM, *Assistant Professor*, 1984. B.S., Ph.D., Colorado State
- VAN DYKE, N. J., *Assistant Professor*, 1978, 1982. B.S., M.S., Clemson; Ph.D., Auburn
- JUNGST, STEVE B., *Research Associate*, 1978. B.S., M.S., Iowa State
- BROWN, PETER, *Superintendent*, 1979, 1981. B.S., M.S., Tennessee
- EBERT, ROBERT A., *Supvr. IV — Herdsman*, 1984. B.S., Kansas State

ANIMAL HEALTH RESEARCH

VAUGHN, J.T., *Dean, Veterinary Medicine*, 1974, 1978. D.V.M., M.S., Auburn
 BECKETT, S.D., *Coordinator, Professor*, 1966, 1973. B.S., Miss. State; D.V.M., M.S., Auburn; Ph.D., Missouri
 SMITH, P.C., *Professor*, 1980. D.V.M., Auburn; M.S., Ohio State; Ph.D., Iowa State
 ROSSI, C.R., *Professor*, 1970. B.S., D.V.M., Illinois; M.S., Ohio State; Ph.D., Illinois
 BLACBURN, B.L., *Assistant Professor*, 1982. B.S., M.S., Andrews; Ph.D., Illinois
 BRUNNER, C., *Assistant Professor*, 1982. Ph.D., D.V.M., Minnesota
 PANANGALA, V.S., *Assistant Professor*, 1980. D.V.M., Pakistan; M.S., Guelph; Ph.D., Cornell
 SARTIN, J.L., *Associate Professor*, 1982. B.S., M.S., Auburn; Ph.D., Okla. State
 STRINGFELLOW, D.A., *Associate Professor*, 1984. D.V.M., Cornell; M.S., Auburn

BOTANY & MICROBIOLOGY

TRUELOVE, BRYAN, *Professor & Acting Head*, 1967, 1975. B.Sc., Ph.D., Sheffield
 DAVIS, NORMAN D., *Professor*, 1958, 1967. B.S., Georgia; M.S., Ph.D., Ohio State
 MCCUIRE, JOHN A., *Professor*, 1968, 1984. B.S., M.S., Miss. State; Ph.D., Auburn
 PETERSON, CURTIS M., *Professor*, 1971, 1984. B.S., Moorhead State; Ph.D., Oregon
 WEETE, JOHN D., *Professor*, 1972, 1982. B.S., M.S., Stephen F. Austin; Ph.D., Houston
 WILLIAMS, JOHN C., JR., *Professor*, 1970, 1982. B.S., M.S., N. Carolina State; Ph.D., Iowa State
 BLEVINS, WILLARD T., *Associate Professor*, 1973, 1978. B.S., Appalachian; M.S., Ph.D., N. Carolina State
 BROWN, ALFRED E., *Associate Professor*, 1980. B.S., Calif. State, Ph.D., UCLA
 CODY, REYNOLDS M., *Associate Professor*, 1961, 1965. B.S., Tennessee; M.S., Ph.D., Miss. State
 DUTE, ROLAND R., *Associate Professor*, 1982, 1987. B.S., M.S., Ohio State; Ph.D., Wisconsin
 BOYD, ROBERT S., *Assistant Professor*, 1988. B.S., M.S., Calif. State Polytech.; Ph.D., California-Davis
 NIELSEN, BRENT L., *Assistant Professor*, 1988. B.S., Brigham Young; Ph.D., Oregon State
 SHAW, JOSEPH J., *Assistant Professor*, 1988. B.S., California-Santa Barbara; Ph.D., California-Riverside

CONSUMER AFFAIRS

TURNER, JOSEPHINE, *Professor & Head*, 1987. B.S., M.S., Alabama; Ph.D., Purdue
 BEAMISH, JULIA O., *Assistant Professor*, 1983. B.S., E. Carolina; M.S., UNC-Greensboro; Ph.D., Va. Tech
 HARDIN, IAN R., *Associate Professor*, 1971, 1977. B.S., Auburn; M.S., Institute of Textile Technology; Ph.D., Clemson
 WARFIELD, CAROL L., *Associate Professor*, 1977, 1982. B.S., S. Dakota State; M.S., Illinois; Ph.D., Illinois

ENTOMOLOGY

BREWER, J. WAYNE, *Head*, 1987. B.S., M.A., Central Michigan; Ph.D., Purdue
 BERGER, ROBERT S., *Professor*, 1963, 1969. B.S., M.S., Texas A&M; Ph.D., Cornell
 HARPER, JAMES D., *Professor*, 1969, 1980. B.S., M.S., Illinois; Ph.D., Oregon State
 CLARK, WAYNE E., *Professor*, 1978, 1983. B.S., M.S., Brigham Young; Ph.D., Texas A&M
 GAYLOR, MICHAEL J., *Associate Professor*, 1978, 1984. B.S., M.S., Auburn; Ph.D., Texas A&M
 HYCHE, LACY L., *Associate Professor*, 1952, 1960. B.S., M.S., Auburn
 KOUSKOLEKAS, COSTAS A., *Associate Professor*, 1967, 1973. B.S., Saloniki; M.S., Missouri; Ph.D., Illinois
 MACK, TIMOTHY P., *Associate Professor*, 1981, 1986. B.S., Colgate; M.S., Ph.D., Penn. State
 MULLEN, GARY R., *Professor*, 1975, 1980. B.A., Northeastern; Ph.D., Cornell
 WILLIAMS, MICHAEL L., *Associate Professor*, 1973, 1978. B.S., Arkansas State; M.S., Ph.D., Va. Tech
 APPEL, ARTHUR G., *Assistant Professor*, 1985. B.A., UCLA; M.S., Ph.D., Cal-Davis
 CANE, JAMES H., *Assistant Professor*, 1984. B.S., SUNY; Ph.D., Kansas
 ESTES, PAUL M., *Assistant Professor*, 1966. B.Sc., Purdue; Ph.D., California
 MILLER, GARY, *Research Associate*, 1983. B.S., Millersville State; M.S., Tennessee

FAMILY AND CHILD DEVELOPMENT

BRADBARD, MARILYN R., *Associate Professor & Head*, 1978, 1984. B.S., New Hampshire; M.S., Ph.D., Georgia
 HENTON, JUNE M., *Professor & Dean*, 1985. B.S., Okla. St.; M.S., Nebraska; Ph.D., Minnesota
 AVERY, ARTHUR W., *Professor & Associate Dean*, 1985. B.A., M.S., Ph.D., Penn State
 LAMKE, LEANNE K., *Associate Professor*, 1985. B.A., N. Dakota; M.S., Ph.D., Texas Tech
 MIZE, JACQUELYN, *Assistant Professor*, 1984. B.A., M.S., Georgia; Ph.D., Purdue
 VAUGHN, BRIAN, *Professor*, 1988. B.A., Arizona State; M.A., Ph.D., Minnesota

FISHERIES AND ALLIED AQUACULTURES

SHELL, E. WAYNE, *Professor & Head*, 1952, 1973. B.S., M.S., Auburn; Ph.D., Cornell
 ROYD, CLAUDE E., *Professor*, 1968, 1977. B.S., M.S., Miss. State; Ph.D., Auburn
 DAVIES, WILLIAM D., *Professor*, 1970, 1983. B.S., Purdue; M.S., Ohio State; Ph.D., N. C. State
 DUNCAN, BRYAN L., *Professor*, 1975, 1982. B.A., Kansas State; Ph.D., Wayne State
 DUNHAM, REX A., *Associate Professor*, 1981, 1987. B.S., Illinois; M.S., Ph.D., Auburn
 GRIZZLE, JOHN M., *Professor*, 1976, 1982. B.S., M.S., Oklahoma State; Ph.D., Auburn

- GROVER, JOHN H., *Professor*, 1971, 1977. B.S., Utah; M.S., Ph.D., Iowa State
- HOSKING, WILLIAM, *Professor*, 1988. B.S., M.S., Ph.D., Georgia
- JENSEN, JOHN W., *Professor*, 1988. B.S., Minnesota; M.S., Ph.D., Auburn
- LOVELL, RICHARD T., *Professor*, 1969, 1975. B.S., M.S., Oklahoma State; Ph.D., LSU
- LOVSHIN, LEONARD L., JR., *Professor*, 1982, 1985. B.A., Miami-Ohio; M.S., Wisconsin; Ph.D., Auburn
- MOSS, DONOVAN D., *Professor*, 1967, 1972. B.S., M.S., Auburn; Ph.D., Georgia
- PHELPS, RONALD P., *Professor*, 1975, 1982. B.S., Ph.D., Auburn
- PLUMB, JOHN A., *Professor*, 1969, 1985. B.A., Bridgewater; M.S., S. Illinois; Ph.D., Auburn
- ROGERS, WILMER A., *Professor*, 1964, 1977. B.S., S. Miss.; M.S., Ph.D., Auburn
- SCHMITTOW, HOMER, R., *Professor*, 1971, 1982. B.S., Tenn. Tech; M.S., Ph.D., Auburn
- SMITHERMAN, RENFORD O., *Professor*, 1967, 1977. B.S., Ph.D., Auburn; M.S., N. C. State
- BAYNE, DAVID R., *Associate Professor*, 1972, 1979. B.A., Tulane; M.S., Ph.D., Auburn
- MALVESTUTO, STEPHEN P., *Associate Professor*, 1979, 1985. B.A. Calif., Santa Barbara; M.S., Nairobi; Ph.D., Auburn
- WALLACE, RICHARD K., *Associate Professor*, 1988. B.S., Ohio Wesleyan; M.S., Univ. Puerto Rico; Ph.D., Auburn
- BAIN, MARK B., *Assistant Professor*, 1988. B.S., W. Virginia; M.S., Va. Polytechnic; Ph.D., Maryland
- BRADY, YOLANDA, *Assistant Professor*, 1986. B.S., Miss.; M.S., Sou. Miss.; Ph.D., Auburn
- POPMA, THOMAS J., *Assistant Professor*, 1977, 1982. B.S., M.S., Michigan State; Ph.D., Auburn
- ROUSE, DAVID B., *Associate Professor*, 1981. B.S., M.S., Auburn; Ph.D., Texas A&M
- GOODMAN, RANDELL K., *Superintendent*, 1975, 1981. B.S., Mid. Tenn. State; M.S., Auburn
- BEAM, RENEE, *Research Associate*, 1985. B.S., South Hampton; M.A., Auburn
- CREMER, MICHAEL, *Post Doctoral Fellow*, 1986. B.S., Humboldt State; M.S., Ph.D., Auburn
- BOCEK, ALEX, *Research Associate*, 1988. B.S., S. Illinois; M.S., Auburn
- CRONE, PAUL R., *Research Associate*, 1987. B.S., Connecticut; M.S., Auburn
- DUNCAN, PATRICIA L., *Research Associate*, 1988. B.S., S. Florida; M.S., Va. Institute of Marine Science
- GREEN, BARTHOLOMEW W., *Research Associate*, 1983. B.A., Case-Western Reserve; M.S., Auburn
- GRIMMETT, JAN H., *Research Associate*, 1988. B.S., Henderson State; Ph.D., Arkansas
- HEMSTREET, WILLIAM G., *Research Associate*, 1985. B.S. Valdosta; M.S., Auburn
- HUGHES, DAVID G., *Research Associate*, 1983. B.S., Washington; M.S., Oklahoma State
- NORGREN, KIMBERLY O., *Research Associate*, 1986. B.A., Lewis & Clark; M.S., Auburn
- REED, MICHAEL S., *Research Associate*, 1987. B.S., M.S., Auburn
- ROBINSON, CURTIS L., *Research Associate*, 1988. B.S., Auburn; M.S., Fairleigh Dickinson
- SEESOCK, WENDY E., *Research Associate*, 1980. B.S., M.S., Auburn
- TEICHERT-CODDINGTON, DAVID, *Research Associate*, 1984. B.S., Houghton; M.S., Ph.D., Auburn
- VEVERICA, KAREN L., *Research Associate*, 1981. B.S., Michigan State; M. Agr., Oregon State
- DEUTSCH, WILLIAM G., *Postdoctoral Fellow*, 1988. B.S., Houghton; M.S., SUNY; Ph.D., Auburn
- WEBBER, ELLIOTT C., *Postdoctoral Fellow*, 1981. B.S., M.C.S., Mississippi; Ph.D., Auburn
- HYDE, CHRIS K., *Aquaculturist*, 1988. B.S., Centenary; M.S., Auburn
- WHITIS, GREGORY N., *Aquaculturist*, 1988. B.S., Iowa State; M.S., Auburn
- PERKINS, BRIAN E., *Seafood Technologist*, 1988. B.S., Georgia State; M.S., LSU

FORESTRY

- THOMPSON, JOHN F., *Professor & Dean, Forestry*, 1977, 1984. B.S., Okla. State; M.S., N. C. State; Ph.D., Oregon State
- HAYGREEN, E.H. G., *Associate Dean*, 1986. B.S., Iowa St.; M.S., Ph.D., Mich. State
- BIBLIS, EVANGELOS J., *Professor*, 1965, 1973. B.F., Thessaloniki; M.F., D.F., Yale
- TANG, R. C., *Professor*, 1978. B.S., National Chung-Hsing; Ph.D., N. C. State
- FLICK, WARREN A., *Associate Professor*, 1977. B.S., Ph.D., Syracuse
- GJERSTAD, DEAN H., *Professor*, 1975, 1988. B.S., M.S., Ph.D., Iowa State
- GOLDEN, MICHAEL S., *Associate Professor*, 1975. A.B., Trevecca; M.S., Auburn; Ph.D., Tennessee
- KELLEY, WALTER, *Associate Professor*, 1966, 1981. B.S., M.S., Auburn; Ph.D., N.C. State
- LANFORD, BOBBY L., *Associate Professor*, 1978. B.S., M.S., Clemson; Ph.D., State University of New York
- LARSEN, H. S., *Associate Professor*, 1980. B.S., Rutgers; M.S., Michigan State; Ph.D., Duke
- ELDER, THOMAS J., *Associate Professor*, 1979. B.S., S. Methodist; M.F., Stephen F. Austin; Ph.D., Texas A&M
- CAULFIELD, JON P., *Assistant Professor*, 1984. B.S., SUNY; Ph.D., N.C. State
- CHAPPELKA, ARTHUR, *Assistant Professor*, 1987. B.S., M.S., Florida; Ph.D., Va. Tech.
- GLOVER, GLENN R., *Assistant Professor*, 1975, 1983. B.S., M.S., Auburn; Ph.D., Va. Tech
- MELDAHL, RALPH S., *Assistant Professor*, 1978. B.S., M.S., Ph.D., Wisconsin
- SOUTH, DAVID, *Associate Professor*, 1975, 1988. B.S., M.S., N. C. State; Ph.D., Auburn
- TEETER, LAWRENCE D., *Assistant Professor*, 1985. A.B., Michigan; Ph.D., Colorado State
- TUFTS, ROBERT A., *Assistant Professor*, 1979, 1981. B.S.F., M.S., LSU; Ph.D., Va. Tech
- CARINO, H. F., *Associate Professor*, 1981, 1988. B.S., M.S., Philippines; Ph.D., Minnesota
- BLAKE, JOHN L., *Assistant Professor*, 1985, 1988. B.S., M.S., Michigan; Ph.D., Washington
- MARTIN, RICHARD H., *Research Associate*, 1978. B.S., M.S., Tennessee
- MILLER, MICHAEL S., *Research Associate*, 1985. Penn. State
- MINOQUE, P. J., *Research Associate*, 1981. B.S., Maryland; M.S., N. C. State
- DIXON, ROBERT K., *Associate Professor*, 1986. B.S., M.S., Ph.D., Minnesota
- FRIDLEY, KENNETH, *Research Associate*, 1986. B.S., Washington State; M.S., Texas
- LOCKABY, B. GRAEME, *Associate Professor*, 1986. B.S., M.S., Clemson; Ph.D., Miss. State
- SOMERS, G.L., *Assistant Professor*, 1987. B.S., Oklahoma St.; M.S., Ph.D., Va. Tech

ZUTTER, BRUCE, *Research Associate*, 1987. B.S., Purdue; M.S., Va. Tech
 BOTTENFIELD, TIMOTHY, *Research Associate*, 1988. B.S., M.S., Michigan Tech
 D'ANIERI, PETER A., *Research Associate*, 1988. B.S., Maine; M.S., VPI
 MITCHELL, ROBERT J., *Assistant Professor*, 1988. B.S.F., M.S.F., Southern Illinois; Ph.D., Missouri-Columbia
 RUNION, G. BRETT, *Postdoctoral Fellow*, 1988. A.A., Academy of New Church; B.S., M.S., Ph.D., N. Carolina State
 STUMPF, NANCY J., *Research Associate*, 1988. B.S., Auburn; M.S., VPI
 WAAGE, SUSAN K., *Postdoctoral Fellow*, 1988. B.S., Ph.D., Mississippi State

GEORGE W. ANDREWS FORESTRY SCIENCES LABORATORY, USDA SILVICULTURE RESEARCH

BOYER, WILLIAM D., *Project Leader & Adjunct Associate Professor*, 1975, 1977. B.S., U.S. Merch. Marine Acad.;
 B.S., M.S., Syracuse; Ph.D., Duke
 MICHAEL, JERRY L., *Adjunct Assistant Professor*, 1977, 1978. B.S. Elon; M.S., N. Carolina; Ph.D., Colorado State
 MILLER, JAMES H., *Adjunct Assistant Professor*, 1978. B.S., Oklahoma State; M.S., Purdue; Ph.D., Oregon State

FOREST ENGINEERING

SIROIS, DONALD L., *Project Leader & Adjunct Associate Professor*, 1976, 1977. B.S., Bucknell
 MCMAHON, CHARLES, *Project Leader*, 1987. B.S., St. Peter's; M.S., Rutgers; M.S.A., Georgia College

HORTICULTURE

SHUMACK, RONALD L., *Professor & Head*, 1972, 1988. B.S., M.A., Ph.D., Michigan State
 CHAMBLISS, OYETTE L., *Professor*, 1970, 1978. B.S., M.S., Auburn; Ph.D., Purdue
 DOZIER, W. ALFRED, JR., *Professor*, 1965, 1984. B.S., M.S., Auburn; Ph.D., Va. Tech
 NORTON, JOSEPH D., *Professor*, 1960, 1973. B.S., M.S., Auburn; Ph.D., LSU
 PONDER, H.G., *Professor*, 1980, 1985. B.S., M.S., Auburn; Ph.D., Michigan State
 SANDERSON, KENNETH C., *Professor*, 1966, 1977. B.S., Cornell; M.S., Ph.D., Maryland
 GILLIAM, C.H., *Professor*, 1980, 1983. B.S., Tennessee-Martin; M.S., Ph.D., Va. Tech
 GOFF, WILLIAM D., *Associate Professor*, 1988. B.S., M.S., Ph.D., Clemson
 KEEVER, GARY J., *Associate Professor*, 1982, 1987. B.S., Clemson; M.S., Ph.D., Cornell
 SMITH, DURWARD A., *Associate Professor*, 1976, 1983. B.A., Washington; B.S., Idaho; M.S., Ph.D., LSU; J.D.,
 Jones Law School
 BROWN, JAMES E., *Assistant Professor*, 1985. B.S., Fort Valley; M.S., Tuskegee; Ph.D., Illinois
 DANGLER, JAMES M., *Assistant Professor*, 1988. B.S., M.S., Ph.D., Florida
 DANE, FENNECHIANA K., *Research Associate*, 1985. B.S., State Agricultural, Wageningen, The Netherlands;
 M.S., New Mexico State; Ph.D., Colorado State
 FARE, DONNA C., *Greenhouse Manager*, 1983, 1987. B.S., Auburn
 HUNTER, ARTHUR G., *Research Associate*, 1983. B.S., La. Tech; M.S., Auburn

NUTRITION AND FOODS

WINTERFELDT, ESTHER A., *Professor & Interim Head*, 1988. B.S., M.S., Oklahoma State; Ph.D., Ohio State
 CLARK, ALFRED J., *Associate Professor*, 1977. B.S., M.S., Ph.D., Iowa State
 CRAIG-SCHMIDT, MARGARET C., *Assistant Professor*, 1977. B.A., Duke; Ph.D., Wisconsin
 KEITH, ROBERT E., *Associate Professor*, 1978, 1983. B.S., M.S., FSU; Ph.D., Va. Tech
 LANE, HELEN W., *Professor*, 1985. B.S., California; M.S., Wisconsin; Ph.D., Florida
 OLDS, S. JEAN, *Assistant Professor*, 1987. B.S., M.A., Eastern Kentucky; Ph.D., Tennessee

PLANT PATHOLOGY

JACOBSEN, B.J., *Professor & Head*, 1973, 1987. B.S., M.S., Wisconsin; Ph.D., Minnesota
 BACKMAN, PAUL A., *Professor*, 1971, 1983. B.S., Ph.D., Cal-Davis
 CURL, ELROY A., *Professor*, 1954, 1967. B.S., La. Tech; M.S., Arkansas; Ph.D., Illinois
 GLDAUSKAS, ROBERT T., *Professor*, 1960, 1969. B.S., E. Illinois State; M.S., Ph.D., Illinois
 BACKMAN, PAUL A., *Professor*, 1971, 1983. B.S., Ph.D., Cal-Davis
 MORGAN-JONES, GARETH, *Professor*, 1973, 1979. B.S., Wales; M.S., Ph.D., Nottingham
 RODRIGUEZ-KABANA, RODRIGO, *Professor*, 1965, 1970. B.S., M.S., Ph.D., LSU
 CLARK, EDWARD M., *Associate Professor*, 1956, 1960. B.S., M.S., Idaho; Ph.D., Minnesota
 LATHAM, ARCHIE J., *Associate Professor*, 1967, 1976. B.S., Idaho State; M.S., Idaho; Ph.D., Illinois
 SHELBY, RICHARD A., *Postdoctorate Research Associate*, 1980. B.S., Mississippi; Ph.D., Auburn
 HERBERT, A.D., *Postdoctoral Fellow*, 1986. B.S., Johnson State; M.S., Ph.D., Auburn
 BOWEN, TERRY M., *Research Associate*, 1987, 1988. Ph.D., Illinois
 JACOBY, JAMES C., *Research Associate*, 1987, 1988. M.S., Clemson
 ROBERTSON, DAVID G., *Research Associate*, 1981, 1983. B.S., Tennessee
 WEAVER, CHARLES F., *Research Associate*, 1982. B.S., Auburn

POULTRY SCIENCE

- BREWER, ROBERT N., *Professor & Head*, 1968, 1987. B.S., M.S., Auburn; Ph.D., Georgia
- MCDANIEL, GAYNER R., *Professor*, 1968, 1979. B.S., M.S., Auburn; Ph.D., Kansas State
- MORA, E.C., *Professor*, 1958, 1967. B.S., New Mexico; M.S., New Mexico State; Ph.D., Kansas State
- MORAN, E.T., JR., *Professor*, 1986. B.S., Rutgers; M.S., Ph.D., Washington State
- ROLAND, DAVID A., *Professor*, 1981. B.S., Ph.D., Georgia
- JOHNSON, L.W., *Associate Professor*, 1955. A.B., Cornell College; M.S., Auburn; Ph.D., Texas A&M
- GIAMBRONE, JOSEPH J., *Professor*, 1977, 1983. B.S., M.S., Delaware; Ph.D., Georgia
- RENDEN, JOSEF, *Associate Professor*, 1981, 1984. B.S., M.S., Ph.D., California
- BILGILI, S.F., *Assistant Professor*, 1985. D.V.M., Ankara, Turkey; M.S., Oregon State; Ph.D., Auburn
- SEXTON, T.J., *Adjunct Professor*, 1979, 1984. B.S., Delaware Valley; M.S., New Hampshire; Ph.D., Penn State
- CLOSSER, J.A., *Research Associate*, 1986. B.S., M.S., Penn State
- RABON, HENRY W., *Research Associate*, 1984. B.S., Albany State (Ga.); M.S., Tuskegee

RESEARCH DATA ANALYSIS

- MCGUIRE, JOHN A., *Professor & Head*, 1968, 1987. B.S., M.S., Miss. State; Ph.D., Auburn
- WILLIAMS, JOHN C., JR., *Professor*, 1970, 1982. B.S., M.S., N.C. State; Ph.D., Iowa State
- TZENG, MEIN—HUEI, *Research Associate*, 1987, 1988. B.S., Taiwan; M.S., Texas Tech

RESEARCH INFORMATION

- STEVENSON, R.E., *Editor & Head*, 1955, 1982. B.S., Auburn
- ROBERSON, J.R., *Associate Editor*, 1973, 1984. B.A., M.A., Auburn
- SMITH, CATHERINE L., *Assistant Editor*, 1988. B.S., Auburn

RESEARCH OPERATIONS

- KELLY, PEYTON E., *Assistant Superintendent, Main Station*, 1974, 1985

SOUTHEAST AGRICULTURE WEATHER SERVICE CENTER*

- GETZ, RODGER R., *Meteorologist in Charge*, 1975, 1988. B.S., M.S., Rutgers
- IHLE, DAVID M., *Agricultural Meteorologist*, 1980. B.S., Oklahoma State; M.S., Naval Post Graduate School
- HARKER, KARL S., *Agricultural Meteorologist*, 1984. B.A., Indiana Central; M.S., Purdue

*All members of this department are cooperative employees with the National Oceanic & Atmospheric Administration of the United States Department of Commerce.

ZOOLOGY & WILDLIFE SCIENCE

- PRITCHETT, JOHN F., *Professor & Head*, 1973, 1982. B.S., M.S., Auburn; Ph.D., Iowa State
- CAUSEY, M. KEITH, *Professor*, 1968, 1974. B.S., M.S., Ph.D., LSU
- FOLKERTS, GEORGE, *Professor*, 1966, 1977. B.A., M.A., Sou. Ill.; Ph.D., Auburn
- MIRARCHI, RALPH E., *Professor*, 1978, 1988. B.S., Muhlenberg; M.S., Ph.D., Va. Tech
- BRADLEY, JAMES T., *Associate Professor*, 1976, 1981. B.S., Wisconsin; Ph.D., Washington
- HOLLER, NICHOLAS R., *Associate Professor*, 1985. B.A., M.A., Ph.D., Missouri
- SPEAKE, DAN W., *Associate Professor*, 1955, 1970. B.S., M.S., Ph.D., Auburn
- GUYER, CRAIG, *Assistant Professor*, 1987. B.A., Humboldt State; M.S., Idaho State; Ph.D., Miami (Fla.)
- KEMPF, STEPHEN C., *Assistant Professor*, 1985. B.S., Case Western Reserve; Ph.D., Hawaii
- SUNDERMANN, CHRISTINE, *Assistant Professor*, 1984. B.S., Iowa State; Ph.D., Georgia
- WOOTEN, MARIE, *Assistant Professor*, 1987. B.S., Memphis State; Ph.D., Texas Woman's University
- WOOTEN, MICHAEL C., *Assistant Professor*, 1986. B.S., Memphis State; Ph.D., N. Texas
- STRIBLING, H. LEE, *Assistant Professor*, 1985. B.S., Sou. Carolina; M.S., Clemson; Ph.D., N.C. State
- BART, HENRY L. JR., *Assistant Professor*, 1988. B.S., M.S., New Orleans; Ph.D., Oklahoma
- HEPP, GARY R., *Assistant Professor*, 1988. B.S., Ohio State; M.S., Clemson; Ph.D., N. Carolina State

E.V. SMITH RESEARCH CENTER

- BRYCE, HARRISON M., *Superintendent, Horticulture Unit*, 1967, 1968. B.S., Auburn
- CONOVER, RICHARD D., *Superintendent, Dairy Unit*, 1985, 1986. B.S., Rutgers
- DUFFIELD, ROBERT R., *Superintendent, Field Crops Unit*, 1986. B.S., Auburn
- GREGORY, WILLIAM H., III, *Superintendent, Beef Cattle Unit*, 1987. B.S., Auburn
- HOGUE, WALTER T., *Superintendent, Farm Services*, 1979. B.S., M. of Ag., Florida
- NIGHTENGAL, STEVAN P., *Superintendent, Plant Breeding Unit*, 1984. B.S., N.W. Oklahoma State; M.S., Oklahoma State
- PITTS, ROBERT O., *Superintendent, Agr. Engr. Unit*, 1956, 1963.

SUBSTATIONS AND FIELDS

Black Belt—Marion Junction, Dallas County

- HOLLIMAN, JAMES LOUIS, *Superintendent*, 1975, 1989. B.S., M.S., Miss. State

PEGUES, MALCOMB D., *Assistant Superintendent*, 1985, 1986. B.S., M.S., Auburn

Chilton Area Horticulture—Clanton, Chilton County

PITTS, JAMES A., *Superintendent*, 1979, 1983. B.S., M.S., Auburn

SHORT, KENNETH C., *Assistant Superintendent*, 1960. B.S., Auburn

Gulf Coast—Fairhope, Baldwin County

CARDEN, EMMETT L., *Superintendent*, 1969, 1978. B.S., M.S., Auburn

McDANIEL, N. R., *Associate Superintendent*, 1969, 1973. B.S., M.S., Auburn

Lower Coastal Plain—Camden, Wilcox County

LITTLE, JOE A., *Superintendent*, 1959, 1975. B.S., W. Kentucky; M.S., Auburn

North Alabama Horticulture—Cullman, Cullman County

HOLLINGSWORTH, M. H., *Superintendent*, 1958, 1962. B.S., Auburn

Ornamental Horticulture Substation—Spring Hill, Mobile County

FOSTER, WILLIAM J., *Superintendent*, 1986, 1986. B.S., Va. Tech; M.S., Florida

STEPHENSON, JAMES C., JR., *Associate Superintendent*, 1981. B.S., M.S., Auburn

Sand Mountain—Crossville, DeKalb County

EASON, J. T., *Superintendent*, 1966, 1974. B.S., M.S., Auburn

RUF, M. E., *Associate Superintendent*, 1976, 1979. B.S., M.S., Auburn

Tennessee Valley—Belle Mina, Limestone County

WEBSTER, W. B., *Superintendent*, 1958, 1977. B.S., M. of Agri., Auburn

BURGESS, HOYT E., *Associate Superintendent*, 1967, 1988. B.S., Auburn

NORRIS, BOBBY E., JR., *Assistant Superintendent*, 1988. M.S., Auburn

Upper Coastal Plain—Winfield, Fayette & Marion Counties

GRIFFEY, WALLACE A., *Superintendent*, 1972, 1989. B.S., M.S., Tennessee

Wiregrass—Headland, Henry County

IVEY, HENRY W., *Superintendent*, 1960, 1985. B.S., Auburn

WELLS, LARRY, *Assistant Superintendent*, 1984, 1985. B.S., M.S., Auburn

GAMBLE, BRIAN E., *Assistant Superintendent*, 1986, 1987. B.S., M.S., Auburn

Brewton & Monroeville Fields—Escambia & Monroe Counties

AKRIDGE, J.K., *Superintendent*, 1967, 1984. B.S., Auburn

Prattville Field—Autauga County

MOORE, DON P., *Superintendent*, 1982. B.S., M.S., Auburn

Alabama Cooperative Extension Service

MARTIN, JAMES E., *President*. B.S., Auburn; M.S., N. C. State; Ph.D., Iowa State

THOMPSON, ANN E., *Vice President for Extension and Director*, 1984, 1986. B.S., Auburn; M.A., Maryland; Ed.D., Oklahoma State

MARION, JAMES E., *Dean of Agriculture**

Department Heads

YEAGER, JOSEPH H., * *Ag. Economics & Rural Sociology*

TURNQUIST, PAUL K., * *Ag. Engineering*

CHAPMAN, LOUIE, (Acting), * *Agronomy & Soils*

MARPLE, DENNIS, (Acting), * *Animal & Dairy Sciences*

BREWER, WAYNE, * *Entomology*

SHELL, E. WAYNE, * *Fisheries & Allied Aquacultures*

CHAMBLISS, OYETTE L., * *Horticulture*

JACOBSEN, BARRY, * *Plant Pathology*

BREWER, ROBERT N.,* *Poultry Science*

Forestry

THOMPSON, EMMETT F., *Dean**

Human Sciences

HENTON, JUNE, *Dean**

Department Heads

TURNER, JOSEPHINE, * *Consumer Affairs*

BRADBARD, MARILYN R.,* *Family & Child Development*

WINTERFELDT, ESTHER, (Acting),* *Nutrition & Foods*

Sciences & Mathematics

LEGG, J. IVAN, *Dean**

Department Head

PRITCHETT, JOHN F.,* *Zoology-Wildlife*

*Titles and degrees appear elsewhere in catalog.

Alabama Cooperative Extension Service Director's Office

CAVENDER, A. RAY, *Associate Dean for Extension, College of Agriculture*, 1958, 1987. B.S., M.S., Tennessee; Ph.D., Wisconsin

ELLIOTT, THOMAS R., *Head, Administrative Services*, 1970, 1979. B.S., Austin Peay; M.Ed., Ed.D., Auburn

EVANS, DENNIS, *Program Evaluation Specialist*, 1977, 1984. B.S., Northwestern; M.A., Ed.D., LSU

FOWLER, SAMUEL, *Acting Associate Director, Field Operations & Governmental Relations*, 1973, 1982. B.S., M.S., Ph.D., Mississippi State

STRAIN, W. L., *Head, Information Services*, 1955, 1984. B.S., M.Ed., Tuskegee; M.S., Wisconsin

SMITH, JACK, *Acting Assistant to Director, Marketing Relations*, 1962, 1976. B.A., Auburn; M.S., Alabama

SMITH, JAMES L., *Head, Personnel & Staff Development*, 1965, 1975. B.S., Edward Waters; M.S., Tuskegee; Ph.D., Ohio State

STRICKLAND, OSCAR, *Head, Program Development*, 1961, 1976. B.S., M.Ag. Ed., Auburn; Ed.D., LSU

TEAGUE, RALPH J., *Coordinator, Management Information*, 1971, 1984. B.S., Auburn

AGRICULTURE AND NATURAL RESOURCES

Extension Agricultural Economics

CREWS, JERRY R., *Economist-Livestock Farm Management*, 1977, 1987. B.S., M.S., Georgia; Ph.D., Auburn

HENSHAW, DOUGLAS M., (Decatur) *Economist-Farm Management*, 1978. B.S., M.S., Kentucky

HUDDLESTON, N. RAY, *Economist-Mkt. Firms*, 1968, 1976. B.S., Tenn. Tech; M.S., Tennessee; Ph.D., Miss. State

HURST, JAMES R., *Economist-Crops Marketing*, 1977. B.S., M.S., Auburn; J. D., Jones Law School

JOHNSON, JAMES LAVAUGHN, *Economist-Crops Farm Management*, 1978. B.S., M.S., Auburn; Ph.D., Kentucky

LINTON, DANIEL A., *Economist-Livestock Marketing*, 1962. B.S., M.S., Auburn

MILLER, W. ALAN, (Headland) *Economist-Farm Business Management (SE)*, 1983. A.B., Indiana, M.S., Tennessee

NOVAK, JAMES L., *Specialist-Microcomputer Applications*, 1985. B.S., M.S., New Hampshire; Ph.D., Clemson

PEPPER, WENDELL H., (Prattville) *Economist-Farm Business Management*, 1985. B.S., Auburn; M.S., Illinois

ROBERTS, LARRY, *Economist-Farm Management*, 1960, 1977. B.S., M.S., Ed.S., Auburn

SIMPSON, EUGENE H., *Economist*, 1983. B.S., Ph.D., Miss. State

SMITH, RICHARD D., (Scottsboro) *Economist-Farm Business Management*, 1986. B.S., Illinois

THOMPSON, NOEL A.D., *Extension Data Analyst*, 1980, 1986. B.S., Jackson State; M.S., Tuskegee

WILLIAMS, JOHN LOUIS, *Economist-Horticulture*, 1978. B.S., M.S., Clemson; Ph.D., Miss. State

YOUNG, GEORGE J., *Coordinator & Economist-Farm Business Management*, 1980, 1984. B.S., M.S., Illinois

Extension Agricultural Engineering

CURTIS, LARRY, *Agricultural Engineer-Soil & Water*, 1976. B.S., M.S., Auburn

- DONALD, JAMES O., *Agricultural Engineer-Processing*, 1976. B.S.A.E., M.S.A.E., Georgia
 OGBURN, CHARLES, *Agricultural Engineer-Power & Machinery*, 1977, 1985. B.S., M.S., Va. Tech; Ph.D., Auburn
 TYSON, TED W., (*New Brockton*) *Agricultural Engineer-Irrigation*, 1985. B.S., M.S., Georgia
 WATSON, HAROLD, *Agricultural Engineer-Structures & Environment*, 1966, 1979. B.S., M.S., LSU

Agronomy

- BALL, DONALD M., *Agronomist-Pastures and Forages*, 1976. B.S., W. Kentucky; M.S., Ph.D., Auburn
 BURDETT, ROBERT A., *Agronomist-Seeds*, 1968, 1977. B.S., M.S., Auburn; Ph.D., Miss. State
 BURMESTER, CHARLES H., (*Belle Mina*) *Research Associate (Agronomy)*, 1980. B.S., M.S., Auburn
 DELANEY, DENNIS P., (*Decatur*), *Ext. Program Associate — Resource Conservation*, 1980, 1984. B.S., Mich. St.; M.S., Clemson
 EVANS, CLYDE E., *Professor (Agronomy & Soils)*, 1955, 1984. B.S., Abilene Christian; M.S., Auburn; Ph.D., N. Carolina State
 HARTZOG, DALLAS*, (*Headland*), *Agronomist-Peanuts*, 1976. B.S., M.S., Auburn
 HENDERSON, JOHN B., *Agronomist-Soybeans*, 1960, 1969. B.S., M.S., Auburn; Ph.D., N. C. State
 MASK, PAUL L., *Agronomist-Grain Crops*, 1982. B.S., Ga. State; M.S., Georgia; Ph.D., Ohio State
 MITCHELL, CHARLES C., JR., *Agronomist — Soil Fertility, and Asst. Professor*, 1984. B.S., Birmingham Southern; M.S., Auburn; Ph.D., Florida
 SHELBY, RICHARD A., *Research Associate (Botany)*, 1980, 1982. B.S., Miss.; Ph.D., Auburn

Animal Science

- McGUIRE, ROBERT LEE, *Head, Ext. Animal Science*, 1974, 1976. B.S., M.S., N. C. State; Ph.D., Kentucky
 BLAYLOCK, ROBERT E., (*Decatur*), *Animal Scientist*, 1976, 1979. B.S., M.S., Miss. State
 COLEMAN, DALE A., *Animal Scientist-Dairy Breeding & Asst. Professor*, 1984. B.S., Colorado State; M.S., Ph.D., W. Virginia
 DANION, JAMES R., *Animal Scientist-Swine*, 1960, 1976. B.S., M.S., Georgia; Ph.D., Auburn
 FLOYD, JAMES G., *Extension Veterinarian & Associate Professor*, 1988. B.S., West Point; D.V.M., LSU; M.S., Illinois
 GIMENEZ, DIEGO M., (*Selma*) *Animal Scientist*, 1978. B.S., M.S., Ph.D., Florida
 JONES, WILLIAM R., *Food Scientist-Meats & Assoc. Professor*, 1975, 1981. B.S., Miss. State; M.S., Ph.D., Va. Tech
 MOSS, BUELON R., *Animal Scientist-Dairy & Professor, Dairy Science*, 1983. B.S., Berea; Ph.D., Tennessee
 RUFFIN, B. G., *Animal Scientist-Beef Nutrition*, 1972, 1976. B.S., M.S., Miss. State; Ph.D., Auburn
 VAN DYKE, NORWOOD J., (*Headland*), *Animal Scientist-Swine and Asst. Prof.*, 1978, 1984. B.S., M.S., Clemson; Ph.D., Auburn

Fisheries

- HYDE, CHRIS, *Extension Aquaculturist*, 1988. B.S., Centenary Col. of Louisiana; M.S., Auburn
 JENSEN, JOHN, *Fisheries Specialist*, 1979. B.S., Minnesota; M.S., Ph.D., Auburn
 WHITIS, GREGORY, *Extension Aquaculturist*, 1987. B.S., Iowa State; M.A., Auburn

Horticulture

- DANGLER, JAMES M., *Ext. Horticulturist & Assistant Professor*, 1988. B.A., St. Michael's; M.S., Ph.D., M.B.A., Florida
 GOFF, WILLIAM D., *Horticulturist-Pecans*, 1982. B.S., M.S., Miss. State, Ph.D., Clemson
 POWELL, ARLIE A., *Horticulturist-Fruits*, 1978. B.S., M.S., Ph.D., Florida
 WARD, COLEMAN, Y., *Horticulturist-Turf & Home Grounds Maintenance & Prof.*, 1979, 1985. B.S., M.S., Texas Tech; Ph.D., Va. Tech
 WILLIAMS, JAMES D., *Extension Program Associate-Home Horticulture*, 1984; B.S., Auburn
 GLOVER, TONY A., *Horticulturist*, 1987, 1988. B.S., M.S., Auburn (Temporary Special Assignment)

Natural Resources

- BRINKER, RICHARD W., *Forest Economist & Assistant Professor*, 1988. B.S., Ph.D., LSU; M.S., So. Mississippi
 WADE, LARKIN H., *Extension Forester*, 1965, 1976. B.S.F., M.S., Auburn
 GILMORE, ALVAN R., *Ext. Program Associate-Forestry*, 1984. B.S.F., Florida; M.F., D.F., Duke
 STRIBLING, HARRY L., *Wildlife Specialist & Asst. Professor*, 1985. B.S., S. Carolina; M.S., Clemson; Ph.D., N. C. State

Pest Management

- FRENCH, JOHN C., *Head, Extension Pest Management*, 1977. B.S., M.S., Auburn; Ph.D., Clemson
 BALCH, TALMADGE, *Pesticide Ed. Specialist*, 1957, 1979. B.S., M.S., Auburn; J.D., Jones Law School
 BROWN, STEVE L., *Specialist-In-Training-Pesticide Education*, 1981, 1984. B.S., M.S., Auburn
 COBB, PATRICIA P., *Entomologist*, 1978. B.S. Huntingdon; M.S., Ph.D., Auburn
 EVEREST, JOHN W., *Weed Scientist*, 1978. B.S., Alabama; M.S., Ph.D., Auburn
 FREEMAN, BARRY, *Entomologist, Cotton*, 1976, 1979. B.S., M.S., Georgia
 GAZAWAY, WILLIAM S., *Plant Pathologist and Nematologist*, 1976. B.S., Miss. State; Ph.D., Texas A&M
 HAGAN, AUSTIN K., *Plant Pathologist and Nematologist*, 1980. B.S., Indiana U. of Penn; M.S., Ph.D., Ohio State

- McVAY, JOHN R., *Pest Management Specialist*, 1976. B.S., N. Alabama; M.S., Auburn
- MONKS, DALE *, (*Belle Mina*) *Research/Extension Associate-Weed Science*, 1985. B.S., Middle Tenn. State; M.S., Arkansas
- MULLEN, JACQUELINE M., *Extension Program Associate-Plant Pathologist*, 1979, 1980. B.A., Northeastern; M.S., Ph.D., Cornell
- PATTERSON, MICHAEL, * *Ext. Weed Scientist & Asst. Professor, Agronomy*, 1980, 1985. B.S., M.S., Ph.D., Auburn
- SMITH, RONALD H., *Entomologist*, 1972. B.S., M.S., Ph.D., Auburn
- STROTHER, GENE, *Entomologist*, 1973, 1976. B.S., M.S., Ph.D., LSU
- WEEKS, JAMES R., (*Headland*), *Pest Management Specialist*, 1975, 1978. B.S., M.S., Auburn

Poultry Extension Specialist

- ECKMAN, MICHAEL, *Coordinator, Poultry Extension*, 1977, 1983. B.S., M.A., N. Colorado; Ph.D., Auburn
- BILGILI, SACIT F., *Poultry Scientist-Processing & Asst. Professor*, 1985. D.V.M., Ankara; M.S., Oregon; Ph.D., Auburn
- BUSHONG, REX D., *Poultry Scientist-Nutrition*, 1986. B.S., M.S., Ph.D., Miss. State

HOME ECONOMICS

- TATE, DOROTHY E., *Associate Dean, Human Sciences*, 1976, 1987. B.S., M.S., Penn. State; Ed.D., N. C. State

Family Living

- ANDERSON, LENDA JO, *Clothing Specialist*, 1976. B.S., La. Tech; M.S., LSU
- AYCOCK, GEORGIA, *Home Furnishing Specialist*, 1974, 1976. B.S., M.Ed., Auburn
- BRANNON, EVELYN L., *Clothing Specialist*, 1980. B.S., M.S., Auburn
- BLOUNT, LAVERNE, *County Agent*, 1983, 1986. B.S., M.S., Alabama A&M; Ph.D., Ohio State (Special Assignment)
- SPEAKMAN, GENTA, *Housing & Equipment Specialist*, 1966, 1976. B.S., M.S., Auburn

Consumer Affairs

- WADDELL, FRED E., *Consumer Economics Specialist & Assistant Professor*, 1988. B.A., Kentucky; M.S., Kansas State; Ph.D., VPI

Food and Nutrition

- CRAYTON, EVELYN, *Foods & Nutrition Specialist*, 1978. B.S., Grambling State; R.D., M.S., St. Louis
- GOEBEL, VIRGINIA, *EFNEP Program Specialist*, 1969, 1977. B.S., M.S., Ed.S., Auburn
- MIKEL, WILLIAM B., *Food & Science Specialist & Assistant Professor*, 1988. B.A., Auburn; M.S., Ph.D., Mississippi State
- STRUEMLER, BARBARA J., *Nutrition Specialist*, 1984. B.S., Nebraska; M.S., Ph.D., Iowa State

Two-Year Assignments

- BROWN, GENEVA, *Ext. Family Life Educator*, 1988. B.A., Women's Col.-UNC; M.S., Ph.D., N. Carolina
- PUCKETT, KIM, *Ext. Health Educator*, 1988. B.A., Florida; M.P.H., UAB

Extension Agents — Ft. McClellan

- BYDE, RITA, *Extension Agent-Latchkey Educator*, 1987. B.S., SUNY; M.S., S. Carolina
- DOBBINS, CELVIA S., *Ext. Agent-Financial Planning & Asst.*, 1986. B.S., Central Michigan; M.S., LSU
- WINGARD, SUSAN F., *Ext. Agent-Financial Planning & Asst.*, 1980, 1986. B.S., N. Alabama
- GRAVETT, CECILIA, *Extension Agent-Exceptional Family Member*, 1987. B.S., Jacksonville State
- GIDDENS, BARBARA J., *Counselor-Family Employment*, 1986. B.A., Bowie State; M.Ed., Maryland-Eastern Shore

Extension Agents — Ft. Rucker

- JACKSON, M. SUE, *Ext. Agent—Family Member Employment*, 1988. B.B.A., Sam Houston
- WILLIAMS, ADELINE, *Ext. Agent—Family Member Employment*, 1988. B.S., Wilberforce

4-H AND YOUTH

- MAYFIELD, CECIL, *State 4-H Club Leader*, 1955, 1970. B.S., M.S., Auburn; Ed.D., LSU
- CHERELLIA, BARBARA, *4-H Specialist-Ldrshp.*, 1958, 1976. B.S., N. Alabama; M.Ed., LSU; Ed.S., Auburn
- COOK, JOHN A., *Specialist-In-Training-4-H Engineering*, 1982, 1985. B.S., M.S., Miss. State
- DOZIER, TONY, *4-H Specialist-ANR*, 1964, 1978. B.S., M.Ed., Ph.D., Auburn
- GUTHRIE, C. TERRELL, (*Columbiana*) *Manager 4-H Center*, 1966, 1982. B.S., Auburn; M.Ed., Miss. State
- HOLLEY, BETTY B., *4-H Prog. Specialist*, 1969, 1986. B.S., Tennessee; M.S., Alabama; Ed.D., Auburn
- STABLER, DEBORAH H., *4-H Specialist-Educational Aids & Information*, 1978. B.A., Troy State; M.A., Alabama
- TATUM, JACK, (*Columbiana*) *Asst. Manager-4-H Center*, 1979, 1988. B.S., Auburn; M.S., Montevallo
- WHITTENBURG, B. L., *Animal Scientist-4-H*, 1965, 1976. B.S., M.S., Tennessee

COMMUNITY RESOURCE DEVELOPMENT

McCORD, R. WARREN, *State Leader, Community Res. Dev.* 1972, 1976. B.S., N. Alabama; M.S., Ph.D., Auburn
 BUFORD, JAMES A., *Mgmt. Scientist & Coord., Mgmt. Dev.*, 1965, 1983. B.S., M.S., Auburn; Ph.D., Georgia
 BURTON, JOHN E., *Leadership Development Specialist*, 1984. B.S., M.S., Utah State; Ph.D., Iowa State
 HOSKING, WILLIAM, (*Mobile*), *Coordinator & Marine Economist*, 1977, 1982. B.S., M.S., Ph.D., Georgia
 LARKIN, WILLIE D., *Organizational Development Specialist*, 1984. B.S., M.Ed., Tuskegee; Ph.D., Ohio State
 LEE, V. WILSON, *Economist-Community Resource Devel.*, 1965, 1976. B.S., Auburn; M.S., Arizona
 PERKINS, BRIAN E., (*Mobile*) *Seafood Technologist*, 1985. B.S., Georgia State; M.S., LSU
 SEGREST, CHARLES H., (*Selma*) — *Specialist-Community Resource Dev.*, 1956, 1983. B.S., M.Ag.Ed., Auburn
 STRAWN, HARRY B., *Economist-Resource Development*, 1969, 1978. B.S., N. Carolina; M.S., Ph.D., Tennessee
 WALLACE, RICHARD K., (*Mobile*) *Fishery Mngmt. Specialist*, 1983, 1985. B.A., Ohio Wesleyan; M.S., Puerto Rico; Ph.D., Auburn

INFORMATION SERVICES

STRAIN, W. L., *Head, Information Services*, 1955, 1984. B.S., M.Ed., Tuskegee; M.S., Wisconsin
 COPELAND, KENNETH J., *Information Specialist-Print Media*, 1957, 1976. B.S., M.Ag. Ed., Auburn
 CROCKETT, ROMAINE S., *Information Specialist-Art*, 1978. B.F.A., Auburn; M.F.A., Syracuse
 HAMBLEY, RICHARD, *Extension Program Associate-Visual Design*, 1975, 1980. B.F.A., Auburn
 LANGCUSTER, JR, JAMES C., *Information Specialist-TV*, 1985. B.A., N. Alabama; M.A., Alabama
 THORNTON, NANCY H., *Information Specialist-Publications*, 1970, 1976. B.A.A., M.Ed., Ed.S., Auburn
 WILLIAMS, G. ELBERT, *Coordinator-Publications, Art and Visuals*, 1960, 1976. B.S., M.Ed., Auburn

Administrative/Support Services

CANAAN, CYNTHIA A., *Assistant Editor*, 1973, 1984. B.A., Auburn
 CREWS, KAREN M., *Extension Program Associate-Administrative Services*, 1977, 1980. B.S., LaGrange
 DAVIS, JONATHAN, *Systems Analyst*, 1987. B.S., Auburn
 DOODY, CHRISTL, *Personnel Specialist*, 1985, 1987. B.S., Troy State
 HILL, MERRELL, *Supply and Logistics Specialist*, 1988.
 HOLLIS, PAUL, *Assistant Editor*, 1985. B.A. Auburn
 JOHNSON, JANICE W., *Personnel Specialist*, 1973, 1983
 JONES, MILTON, *Supervisor-Publications & Mail*, 1977, 1981. B.S., SUNY
 MIMS, ANNE, *Microcomputer Specialist*, 1987. B.S., Auburn
 PRESLEY, WILLIAM, *Systems Analyst*, 1988. B.S., Livingston
 SMITH, BRENDA, *Microcomputer Analyst*, 1987. B.S., Auburn
 WHITMAN, JAY S., *Management Information Analyst*, 1981, 1985. B.S., Auburn

*Holds joint appointment with The Alabama Agricultural Experiment Station or College of Agriculture

COUNTY PERSONNEL

District Staff

E. JEWELL COATS, *District Agent-ANR*, 1966, 1976. B.S., W. Kentucky; M.S., Auburn; Ed.S., Miss. State
 J. O. CONWAY, *District Agent-4-H*, 1967, 1976. B.S., M.Ed., Auburn; Ed.S., Miss. State
 WILLIAM W. CURTIS, *District Agent-ANR*, 1963, 1976. B.S., M.S., Auburn; Ed.D., LSU
 ROBERT C. FARQUHAR, *District Agent-Coordinator*, 1949, 1979. B.S., M.S., Auburn
 L. SHELTON HAWSEY, *District Agent-4-H*, 1965, 1976. B.S., M.Ed., Auburn; Ed.S., Miss. State
 W. GAINES SMITH, *District Agent-ANR*, 1965, 1976. B.S., M.Ag., Ph.D., Auburn
 P.H. WADDY, JR., *District Agent-4-H*, 1964, 1976. B.S., Alabama A&M; M.S., Tuskegee; Ph.D., Ohio State

County Staffs

Autauga County—Prattville

MAX SCOTT, *County Agent-Coordinator*, 1962, 1981. B.S., M.Ag., Auburn
 SUSAN ANN McCONNELL, *County Agent*, 1975, 1986. B.S., M.A.T., Montavillo
 JEFFERY MOORE, *Associate County Agent*, 1980. B.S., Tuskegee
 JUANITA STEWART, *Assistant County Agent*, 1988. B.S., Montevallo

Baldwin County—Bay Minette

LYNDELL ED TUNNELL, *County Agent-Coordinator*, 1973, 1984. B.S., M.Ed., Auburn
 DONALD EUGENE DUNN, *County Agent*, 1962, 1979. B.S., Auburn
 GRACE KIRKMAN, *County Agent*, 1975, 1982. B.S., M.S., Alabama
 DENNIS PETERSON, *County Agent*, 1973, 1985. B.S., M.S., Auburn
 JOYCE M. STAUDT, *County Agent*, 1970, 1982. B.S., N. Alabama; M.S., Alabama

Barbour County—Clayton

JAMES L. MCGHEE, *County Agent-Coordinator*, 1968, 1980. B.S., Alabama A&M; M.Ed., Tuskegee
WILLIAM J. HARDY, JR., *Assistant County Agent*, 1988. B.S., M.S., Auburn
RUTH H. HUNTER, *County Agent*, 1974, 1987. B.S., N. Alabama
CHARLES R. MASON, *Associate County Agent*, 1980, 1985. B.S., M.S., Auburn

Bibb County—Centreville

FAYE B. SMITH, *County Agent*, 1964, 1984. B.S., Alabama

Blount County—Oneonta

GEORGE CLAYTON HOOMES, *County Agent-Coordinator*, 1963, 1977. B.S., M.Ag., Auburn
E. CONNIE GRIMES, *Assistant County Agent*, 1988. B.S., M.S., Auburn
JANICE A. HARPER, *Associate County Agent*, 1980, 1987. B.S., Alabama A&M
BENNIE CAROL REID, *Associate County Agent*, 1985. B.S., Samford; M.A.T., Montevallo

Bullock County—Union Springs

JIMMY D. SMITHERMAN, *County Agent-Coordinator*, 1978, 1987. B.S., M.S., Auburn
ARMSTEAD YOUNG, *Assistant County Agent*, 1973, 1976. B.S., M.S., Tuskegee
RASSIE FARMER, *County Agent*, 1967, 1987. B.S., Langston; M.Ed., Tuskegee

Butler County—Greenville

BARRY E. WOOD, *County Agent-Coordinator*, 1966, 1985. B.S., Auburn
LINDA LUMAN, *Associate County Agent*, 1982, 1985. B.S., Auburn; M.S., FSU
JAMES R. WILLIAMS, *Associate County Agent*, 1980, 1986. B.S., Auburn
VALERIE YATES, *Associate County Agent*, 1983, 1986. B.S., Montevallo

Calhoun County—Anniston

LARRY EASTERWOOD, *County Agent-Coordinator*, 1961, 1983. B.S., M.Ed., Auburn
BRENDA ALLEN, *County Agent*, 1978, 1987. B.S., M.S., Tuskegee
RUSSELL LANGLE, *Assistant County Agent*, 1988. B.S.A., Arkansas State
BARBARA MOBLEY, *County Agent*, 1966, 1976. B.A., M.A., Mississippi
RUTH G. SARRO, *Associate County Agent*, 1980, 1985. B.S., Auburn
MAZIE WILSON, *County Agent*, 1972, 1983. B.S., Alabama A&M; M.A.T., Montevallo

Chambers County—LaFayette

BRENDA JONES, *County Agent-Coordinator*, 1971, 1986. B.S., Jacksonville State M.S., Montevallo
ROSALIND R. JENKINS, *Associate County Agent*, 1980, 1985. B.S., M.Ed., Tuskegee
LEONARD L. KUYKENDALL, *Associate County Agent*, 1979, 1986. B.S., Auburn; M.S., Murray State

Cherokee County—Centre

CHARLES R. MOODY, *County Agent-Coordinator*, 1964, 1976. B.S., M.Ag., Auburn
DAVID E. DERRICK, *County Agent*, 1978, 1983. B.S., Auburn
LINDA A. GLASS, *Associate County Agent*, 1978, 1987. B.S., Alabama A&M

Chilton County—Clanton

TOMMY J. BROWN, *County Agent—Coordinator*, 1971, 1983. B.S., M.S., Auburn
SARAH H. McDOWELL, *County Agent*, 1967, 1977. B.S., Montevallo

Choctaw County—Butler

ELAINE B. SHIELDS, *Associate County Agent-Coordinator*, 1982, 1986. B.S., Alabama; M.Ed., Livingston
ELAINE B. ALBERSON, *Assistant County Agent*, 1988. B.S., Samford
WHEELER G. FOSHEE, III, *Assistant County Agent*, 1985. B.S., Auburn
JOHN OLLISON, *Assistant County Agent*, 1981. B.S., Alabama A&M

Clarke County—Grove Hill

JOE ANN ARTHUR, *County Agent-Coordinator*, 1967, 1984. B.S., S. Miss.; Ed.S., Miss. State
JAMES J. ROE, *Assistant County Agent*, 1985. B.S., William Jewell College; M.S., Duke

Clay County—Ashland

TOM FARROW, *County Agent Coordinator*, 1970, 1976. B.S., M.Ed., Auburn
THOMAS D. FUTRAL, *Associate County Agent*, 1985. B.S., Auburn
MARSHA MOOREHEAD, *Associate County Agent*, 1976, 1987. B.S., M.S., Auburn

Cleburne County—Heflin

ELEANOR MATHEWS, *Associate County Agent*, 1984, 1987. B.S., Auburn

DAVID G. MITCHELL, *Associate County Agent*, 1981, 1986. B.S., Auburn; M.S., Miss. State

Coffee County—New Brockton

ANGELA G. HUGHES, *County Agent*, 1973, 1984. B.S., Alabama

RICHARD PETCHER, *Assistant County Agent*, 1988. B.S., M.S., Auburn

DAN J. PRESLEY, *County Agent*, 1964, 1977. B.S., M.Ag., Ed.S., Auburn

SANDRA T. COFFEY, *County Agent*, 1972, 1983. B.S., Tennessee

Colbert County—Tuscumbia

JERRY L. PARKER, *County Agent-Coordinator*, 1960, 1976. B.S., M.Ed., Auburn

CHARLES E. ANDREWS, *County Agent*, 1973, 1982. B.S., Tuskegee

REBECCA M. DOLLMAN, *County Agent*, 1974, 1987. B.S., Auburn

TERESA C. McDONALD, *County Agent*, 1976, 1986. B.S., M.Ed., Alabama A&M

DANNY JOE POTTER, *County Agent (Pest Mgmt.)*, 1973, 1986. B.S., Auburn; M.Ed., Miss. State

HAROLD E. ROSE, *County Agent*, 1961, 1976. B.S., M.Ext.Ed., Miss. State

Conecuh County—Evergreen

HAZEL H. HARPE, *County Agent*, 1961, 1979. B.A., Judson

EMILY H. BROGDEN, *Associate County Agent*, 1980, 1987. B.S., Auburn

STANLEY WINDHAM, *Associate County Agent*, 1983, 1987. B.S. Colorado State; Miss. State

Coosa County—Rockford

MELINDA LUKER, *County Agent-Coordinator*, 1978, 1986. B.S., M.S., Auburn

ROGER C. VINES, *Associate County Agent*, 1983, 1987. B.S., Auburn; M.S., LSU

Covington County—Andalusia

TIMOTHY REED, *County Agent Coord.*, 1986. B.S., M.S., Auburn; Ph.D., Clemson

WILLIE DURR, *Associate County Agent*, 1979, 1986. B.S., Alabama A&M

EVELYN I. WAITES, *Associate County Agent*, 1984. B.S., B.S.Ed., Jacksonville State; M.A.T., Montevallo

Crenshaw County—Luverne

LATHAN D. HOOKS, *County Agent-Coordinator*, 1971, 1982. B.S., M.S., Auburn

HELEN J. SAFFOLD, *County Agent*, 1977, 1986. B.S., Alabama A&M; M.S., Tenn. State

W. GAYLE WHITE, *County Agent*, 1973, 1984. B.S., Auburn

Cullman County—Cullman

R. GREGG HODGES, *County Agent-Coordinator*, 1975, 1982. B.S., M.S., Miss. State; Ed.S., Alabama

BILLY R. BASWELL, *County Agent*, 1966, 1981. B.S., Auburn; M.E.E., Miss. State

ELAINE W. COLE, *County Agent*, 1973, 1983. B.S., M.A., Alabama

PEGGY M. HARRIS, *County Agent*, 1964, 1979. B.S., Montevallo; M.Ed., Alabama A&M

CHARLES B. PINKSTON, *Assistant County Agent*, 1983, 1985

Dale County—Ozark

JAMES H. ESTES, *County Agent-Coordinator*, 1963, 1977. B.S., M.Ag., Auburn

IDA JO HARRISON, *County Agent*, 1970, 1976. B.S., Montevallo; M.Ed., Tennessee

TERESA Z. WILLIAMS, *County Agent*, 1980, 1986. B.S., Montevallo; M.Ed., Auburn

Dallas County—Selma

NORMA M. McCORRY, *County Agent-Coordinator*, 1961, 1985. B.S., S. Miss.; M.S., Alabama

HARRIET R. BATES, *County Agent*, 1974, 1985. B.S., M.Ed., Alabama State

SAM D. CARROLL, *County Agent*, 1977, 1979. B.S., M.S., Auburn

DeKalb County—Fort Payne

CURTIS H. O'DANIEL, *County Agent-Coordinator*, 1965, 1978. B.S., M.Ed., Auburn

TERRY L. SHACKELFORD, *Associate County Agent*, 1974, 1984. B.S., Alabama A&M

ANNETTE M. WALDRUP, *County Agent*, 1977, 1986. B.S., Jacksonville State; M.A., Alabama

Elmore County—Wetumpka

WAYNE E. DAVIS, *County Agent-Coordinator*, 1959, 1981. B.S., M.S., Auburn

RALPH R. BEAUCHAMP, *County Agent*, 1980, 1984. B.S., M.Ag., Auburn

MARILEE TANKERSLY, *County Agent*, 1975, 1984. B.S., M.S., Auburn

GWENDOLYN TURNER, *County Agent*, 1968, 1982. B.S., Alabama A&M

Escambia County—Brewton

OLIN FARRIOR, *County Agent-Coordinator*, 1982, 1987. B.S., Auburn; M.S., Miss. State
CAROLYN F. BIVINS, *County Agent*, 1974, 1984. B.S., Tuskegee
PEGGY G. BRACKEN, *County Agent*, 1963, 1976. B.S., Auburn
DRU E. RUSH, *Assistant County Agent*, 1985. B.S., Auburn

Etowah County—Gadsden

CELESTE H. MARTIN, *County Agent-Coordinator*, 1957, 1980. B.S., M.A., Auburn
TINLEY H. GREGG, *Assistant County Agent*, 1982, 1987. B.S., M.Ag., Auburn
MARY L. JORDAN, *County Agent*, 1978, 1987. B.S., M.S., Auburn
ELOISE O. TURK, *County Agent*, 1970, 1979. B.S., Alabama A&M; M.A.T., Indiana
RONNIE W. WHITE, *County Agent*, 1978, 1987. B.S., Auburn; M.S., Miss. State

Fayette County—Fayette

JAMES P. TUCKER, *County Agent-Coordinator*, 1961, 1976. B.S., M.Ag., Auburn
WARREN GRIFFITH, *Assistant County Agent*, 1983. B.S., Auburn
PAULA I. THREADGILL, *Associate County Agent*, 1978. B.S. Alabama
JOAN R. WEAVER, *Associate County Agent*, 1977, 1985. B.S., Auburn

Franklin County—Russellville

WAYMON RAY PACE, *County Agent-Coordinator*, 1972, 1979. B.S., M.S., Auburn; Ed.S., Miss. State
BARBARA HILLMAN, *Assistant County Agent*, 1985. B.S., N. Alabama
R. MICHAEL MURPHY, *Associate County Agent*, 1981, 1988. B.S., Auburn; M.S., Miss. State
KAREN M. THOMPSON, *County Agent*, 1974, 1986. B.S., Montevallo; M.S., Alabama

Geneva County—Geneva

EMILY H. SEAY, *County Agent-Coordinator*, 1960, 1986. B.S., Montevallo; M.S., Auburn
MARY N. BALTIKAUSKI, *Associate County Agent*, 1979, 1984. B.S., Auburn
ROBERT T. BOOZER, *Assistant County Agent*, 1986. B.S., M.S., Auburn
LINDA E. SARTAIN, *County Agent*, 1978, 1987. B.S., Ed.S., Auburn

Greene County—Eutaw

JERRY B. CLARK, *County Agent-Coordinator*, 1965, 1977. B.S., M.Ed., Auburn; Ed.S., Miss. State
WILLIE E. DATCHER, *Assistant County Agent*, 1984. B.S., Alabama A&M
CHERYL B. KING, *Assistant County Agent*, 1983. B.S., Southern

Hale County—Greensboro

GWINN R. EZELL, *County Agent-Coordinator*, 1962, 1981. B.S., Alabama A&M; M.Ed., Tuskegee
JAMES CLARY, *County Agent*, 1974, 1985. B.S., Auburn
EVELYN D. EDWARDS, *County Agent*, 1966, 1976. B.S., M.S., Alabama
SHARON D. MANN, *Assistant County Agent*, 1986. B.S., Freed-Hardeman College

Henry County—Abbeville

MARGARET KIRKLAND, *County Agent-Coordinator*, 1961, 1976. B.S., M.H.Ed., Jacksonville State; Ed.S., Auburn
JAMES JONES, *Assistant County Agent*, 1988. B.S., M.S., Auburn
JEWEL W. HARDWICK, *County Agent*, 1958, 1982. B.S., Auburn

Houston County—Dothan

REAFIELD VESTER, *County Agent-Coordinator*, 1966, 1986. B.S., Ala. A&M; M.S., Florida
CLAUDIA MEADOWS, *County Agent*, 1971, 1984. B.S., Auburn
RICHARD W. MURPHY, *Associate County Agent*, 1978, 1985. B.S., Auburn
C. LAMAR NICHOLS, *Assistant County Agent*, 1982. B.S., W. Kentucky
JEFFERY THOMPSON, *Associate County Agent*, 1980, 1987. B.S., M.S., Auburn
PATSY M. WHITE, *County Agent*, 1970, 1981. B.S., M.S., Troy State

Jackson County—Scottsboro

MARIE P. DOMBHART, *County Agent*, 1975, 1985. B.S., Auburn; M.S., Livingston
BETTY D. MOORE, *County Agent-Coordinator*, 1963, 1976. B.S., M.S., Auburn
JAMES A. SHARP, *County Agent*, 1973, 1984. B.S., Auburn; M.S., Alabama A&M
LEWIS L. TAPLEY, *Assistant County Agent*, 1981. B.S., Auburn

Jefferson County—Birmingham

RUDY PAUL YATES, *County Agent-Coordinator*, 1960, 1977. B.S., M.Ag., Auburn
DAVID W. BRADFORD, *County Agent*, 1969, 1979. B.S., M.S., Auburn
DAVID H. HUBBARD, *Associate County Agent*, 1978, 1985. B.S., M.Ag., Auburn
HIRAM N. McCALL, *County Agent*, 1970, 1982. B.S., Auburn; M.Ed., Miss. State

JACKIE F. McDONALD, *County Agent*, 1973, 1984. B.S., Tenn. Tech
CARRIE LENA KNIGHT, *County Agent*, 1971, 1977. B.S., Auburn; M.A., Alabama
EMILY J. SMITH, *County Agent*, 1978, 1983. B.S., Alabama
HELEN T. WILSON, *County Agent*, 1970, 1977. B.S., M.Ed., Alabama A&M

Lamar County—Vernon

JANICE B. DOWDLE, *County Agent—Coordinator*, 1970, 1987. B.S., M.S., Jacksonville State
DAVID W. ROBINSON, *Associate County Agent*, 1978, 1987. B.S., Miss. State; M.Ed., Miss. State
MAC D. WASHINGTON, *County Agent*, 1979, 1983. B.S., Alabama A&M; M.S., Ohio State

Lauderdale County—Florence

ROBERT T. HUGHES, *County Agent—Coordinator*, 1958, 1985. B.S., Alabama A&M; M.S., Tuskegee
MELANIE ALLEN, *Assistant County Agent*, 1988. B.S., N. Alabama; M.S., Auburn
RANDALL ARMSTRONG, *County Agent*, 1974, 1986. B.S., M.S., Auburn
CRAIG D. DOWDY, *Assistant County Agent*, 1988. B.S., M.S., Miss. State
SANDRA O. HARPER, *County Agent*, 1970, 1982. B.S., M.S., N. Alabama
RONALD D. LANE, *County Agent*, 1973, 1985. B.S., M.S., Auburn
ANN M. LAMPERT, *County Agent*, 1979, 1987. B.S., N. Alabama; M.S., Alabama

Lawrence County—Moulton

JAMES E. PINION, *County Agent—Coordinator*, 1966, 1986. B.S., M.Ed., Auburn
HENRY J. BUCHANAN, *Associate County Agent*, 1970, 1976. B.S., M.A., Alabama A&M
MARTHA H. POOL, *County Agent*, 1966, 1983. B.S., Jacksonville State; M.Ed., N. Alabama

Lee County—Opelika

JEFFREY CLARY, *County Agent—Coordinator*, 1973, 1977. B.S., M.Ed., Auburn
ANNE B. CHURCH, *Associate County Agent*, 1982. B.S., M.S., Auburn
LAWRENCE E. QUICK, *Assistant County Agent*, 1986. B.S., M.S., Auburn
BOBBY G. SPEARS, *County Agent*, 1977, 1983. B.S., M.Ag., Auburn
MATTIE FORT, *County Agent*, 1974, 1987. B.S., Alabama A&M

Limestone County—Athens

CURTIS L. GRISSOM, *County Agent—Coordinator*, 1976, 1986. B.S., M.S., Auburn
ATHELSTINE H. MALONE, *County Agent*, 1956, 1976. B.S., Alabama A&M
REETHA A. CHRISTOPHER, *Associate County Agent*, 1980, 1987. B.S., Tennessee
JEFFERY E. BUTLER, *Assistant County Agent*, 1988. B.S., M.Ag., Auburn

Lowndes County—Hayneville

DAVID L. DANIEL, *County Agent—Coordinator*, 1972, 1984. B.S., Alabama A&M; M.Ed., Tuskegee
KATIE WELCH JACKSON, *County Agent*, 1973, 1986. B.S., Alabama; M.A., Montevallo
SAM WIGGINS, *Associate County Agent*, 1983. B.S., Auburn

Macon County—Tuskegee

JOHN S. PULLIAM, *Associate County Agent*, 1980, 1986. B.S., Tuskegee
ANNETTE B. WALLACE, *County Agent*, 1966, 1979. B.S., M.S., Alabama A&M; Ed.S., Tuskegee

Madison County—Huntsville

ROBERT BURTON, *County Agent*, 1962, 1977. B.S., M.Ed., Alabama A&M
VICTORIA M. COFFEE, *County Agent*, 1973, 1985. B.S., Alabama
ALYCE B. ELLIOTT, *County Agent*, 1972, 1984. B.S., Alabama A&M
MARK H. HALL, *County Agent*, 1978, 1987. B.S., M.S., Auburn
JACQUELYN B. IFILL, *County Agent—Coordinator*, 1968, 1977. B.S., Tuskegee; M.Ed., Alabama A&M
PAUL PINYAN, *Assistant County Agent*, 1988. B.S., Auburn
GARY E. MURRAY, *County Agent*, 1974, 1985. B.S., M.S., Auburn

Marengo County—Linden

CHARLES E. SMITH, *County Agent—Coordinator*, 1967, 1981. B.S., M.Ed., Auburn
WILLIAM N. NORWOOD, *County Agent*, 1973, 1984. B.S., Alabama A&M; M.Ed., Tuskegee
ROSALYN KETCHUM PALMER, *County Agent*, 1960, 1976. B.S., Auburn

Marion County—Hamilton

BOBBY J. WALLACE, *Associate County Agent—Coordinator*, 1979, 1987. B.S., Auburn; M.Ed., Miss. State
MICHAEL HENSHAW, *Associate County Agent*, 1983, 1987. B.S., M.S., Kentucky
LISA MURPHY, *Associate County Agent*, 1981, 1988. B.S., N. Alabama; M.S., Miss. State

Marshall County—Guntersville

FRANKLIN H. WOOD, *County Agent-Coordinator*, 1963, 1977. B.S., M.Agr., Auburn
EUNICE P. TIBBS, *County Agent*, 1973, 1987. B.S., Alabama A&M
I. JANNETTE LACKEY, *County Agent*, 1965, 1977. B.S., Auburn; M.S., Tennessee
CHARLES HOWARD, *Associate County Agent*, 1979, 1986. B.S., Auburn

Mobile County—Mobile

CHARLES H. KILPATRICK, *County Agent-Coordinator*, 1964, 1979. B.S., Auburn; M.A., S. Alabama
BRETA M. ROGERS, *County Agent*, 1983, 1986. B.S., M.S., Tuskegee
MYRA N. BARTON, *County Agent*, 1968, 1977. B.S., Montevallo; M.S., S. Alabama
MARJORIE S. DAY, *County Agent*, 1972, 1984. B.S., Auburn
HAROLD M. DENNISON, *Associate County Agent*, 1978, 1984. B.S., Tennessee
ANDREW D. GREER, *County Agent*, 1973, 1985. B.S., Auburn; M.S., S. Alabama
JULIA MCCOLLUM, *County Agent-Urban*, 1975, 1981. B.S., N. Carolina A&T; M.S., Sou. Miss

Monroe County—Monroeville

MARIE M. GALEMORE, *Associate County Agent*, 1988. B.S., Auburn
MIKE M. GAMBLE, *County Agent*, 1966, 1979. B.S., Miss. State
GLORIA R. MUSSON, *Associate County Agent*, 1983. B.S., Auburn
RODIE M. RUFFIN, *County Agent*, 1973, 1985. B.S., M.Ed., Tuskegee

Montgomery County—Montgomery

ADDIE BRYANT, *County Agent-Coordinator*, 1954, 1977. B.S., M.S., Tuskegee
JUDITH BROWN, *County Agent*, 1970, 1977. B.S., M.Ed., Auburn
LARRY J. CRAFT, *Associate County Agent*, 1980, 1985. B.S., Auburn
MARIE M. CRENSHAW, *Associate County Agent*, 1967, 1984. B.S., M.Ed., Tuskegee
SHELBY B. POWELL, *County Agent*, 1972, 1986. B.S., M.Ed., Tuskegee
BOBBY L. HANKS, *County Agent*, 1974, 1984. B.S., M.S., Auburn
JANICE K. JARRETT, *County Agent*, 1980, 1985. B.S., N. Alabama
GEORGE STRITIKUS, *County Agent*, 1977, 1985. B.S., M.S., Auburn

Morgan County—Hartselle

RONALD W. BRITNELL, *County Agent*, 1976, 1987. B.S., Auburn; M.S., Alabama A&M
WATKINS CARTER, *County Agent-Coordinator*, 1967, 1987. B.S., M.S., Miss. State
JULIE A. DUTTON, *County Agent*, 1977, 1982. B.S., Tenn. Tech; M.S., Alabama A&M
THELMA E. GOTTLER, *County Agent*, 1974, 1984. B.S., M.A.T., Montevallo
COLLIE GRADDICK, *Assistant County Agent*, 1988. B.S., Ft. Valley; M.S., Tuskegee

Perry County—Marion

RICHARD E. SMITH, *County Agent-Coordinator*, 1962, 1983. B.S., Alabama A&M; M.Ed., Tuskegee
JOYCE N. RICHARDSON, *County Agent*, 1958, 1979. B.S., Judson

Pickens County—Carrollton

EDWARD N. GRAHAM, *County Agent-Coordinator*, 1960, 1976. B.S., M.S., Miss. State
PATTI PRESLEY, *Assistant County Agent*, 1988. B.S., B.S., M.S., Miss. State
THEODIS HENDERSON, *Associate County Agent*, 1975, 1986. B.S., Alabama A&M

Pike County—Troy

TED B. SMITH, *County Agent-Coordinator*, 1963, 1983. B.S., Auburn; M.S., Troy State
DENA L. BARNES, *County Agent*, 1973, 1986. B.S., M.Ed., Auburn
DAVID B. CARPENTER, *Associate County Agent*, 1975, 1982. B.S., Auburn
TAMMARA A. POWELL, *County Agent*, 1978, 1986. B.S., Montevallo; M.S., Alabama A&M

Randolph County—Wedowee

TOM F. BURNSIDE, JR., *County Agent-Coordinator*, 1960, 1983. B.S., M.Ed., Auburn
CHRISTINE B. BAILEY, *County Agent*, 1978, 1986. B.S., N. Alabama; M.Ed., Auburn
ELAINE E. NELSON, *County Agent*, 1969, 1982. B.S., Jacksonville State
RUSSELL PARRISH, *Associate County Agent*, 1982, 1987. B.S., Auburn

Russell County—Phenix City

BETTY H. WILSON, *County Agent-Coordinator*, 1971, 1983. B.S., Montevallo; M.Ed., Auburn
DONALD BICE, *County Agent*, 1970, 1986. B.S., Auburn
PHILLIP M. BRANNEN, *Assistant County Agent*, 1988. B.S., M.S., Georgia
AGNES C. FIELDS, *Assistant County Agent*, 1981, 1988. B.S., Tuskegee; M.S., Montevallo

Shelby County—Columbiana

LEE GRANT GOBER, *County Agent-Coordinator*, 1960, 1977. B.S., M.S., Auburn
 MICHAEL E. BRASFIELD, *Assistant County Agent*, 1988. B.S., Auburn
 RICKY COLQUITT, *Assistant County Agent*, 1988. B.S., Auburn
 JOHN E. JONES, *County Agent*, 1958, 1977. B.S., Auburn
 ANGELA TREADAWAY, *Assistant County Agent*, 1985, 1986. B.S., Montevallo
 PEGGY A. PRUCNAL, *County Agent*, 1969, 1981. B.S., M.S., Jacksonville State

St. Clair County—Pell City

DOROTHY P. BRICE, *County Agent-Coordinator*, 1970, 1986. B.S., Alabama A&M; M.A.T., Montevallo
 DONNA M. DICKINSON, *Associate County Agent*, 1978, 1986. B.S., N. Alabama
 DONALD LESTER, *County Agent*, 1973, 1982. B.S., M.Ed., Auburn

Sumter County—Livingston

BOB G. SPEARS, *County Agent-Coordinator*, 1964, 1981. B.S., Oklahoma State; M.S., Tennessee
 WILLIE H. LAMPLEY, *Assistant County Agent*, 1986. B.S., Tuskegee; M.Ed., Alabama A&M
 DENISE R. SHIRLEY, *Assistant County Agent*, 1988. B.S., Auburn
 GLORIA R. STEINHILBER, *County Agent*, 1970, 1986. B.S., Montevallo

Talladega County—Talladega

MARIE H. PLAYER, *County Agent-Coordinator*, 1957, 1976. B.S., Alabama A&M; M. Ed., Tuskegee
 WANDA P. JURRIAANS, *County Agent*, 1965, 1976. B.S., Jacksonville State; M.A., Auburn
 AUSTIN WILLIAMS, *Associate County Agent*, 1980, 1986. B.S., Auburn

Tallapoosa County—Dadeville

JERRY G. HANKS, *County Agent-Coordinator*, 1970, 1982. B.S., M.S., Auburn
 NELDA B. MARTIN, *County Agent*, 1971, 1976. B.S., Alabama; M.A., Auburn

Tuscaloosa County—Tuscaloosa

JO ANN H. COOK, *County Agent-Coordinator*, 1970, 1979. B.S., M.S., Alabama
 EVELYN BLACKMON, *County Agent*, 1965, 1983. B.S., Alabama A&M; M.A., Alabama
 STANLEY W. FORD, *County Agent*, 1979, 1986. B.S., Auburn; M.S., Miss. State
 JOE D. HESTER, *Associate County Agent*, 1982, 1985. B.S., M.S., Auburn
 R. LLOYD WEATHERLY, *Associate County Agent*, 1984. B.S., Murray State; M.Ag., Miss. State
 VERA J. WILSON, *County Agent*, 1965, 1981. B.S., Alabama A&M

Walker County—Jasper

D. RAY RICE, *County Agent-Coordinator*, 1974, 1986. B.S., M.S., Auburn
 CHERRY CARTER, *Associate County Agent*, 1982. B.S., Auburn
 RICHARD FORD, *Associate County Agent*, 1981. B.S., M.Ed., Alabama A&M
 SHIRLEY WHITTEN, *Associate County Agent*, 1981, 1986. B.S., Auburn; M.S., Alabama A&M

Washington County—Chatom

THOMAS E. FULLER, *County Agent-Coordinator*, 1969, 1980. B.S., M.S., Auburn
 PATRICIA ANN DICKEY, *Associate County Agent*, 1968, 1976. B.S., Alabama
 SARAH H. HAZEN, *County Agent*, 1964, 1976. B.S., Auburn
 ARTHUR L. THREATT, *Associate County Agent*, 1980, 1987. B.S., Alabama A&M

Wilcox County—Camden

BETTY B. HOLLINGER, *County Agent-Coordinator*, 1977, 1987. B.S., M.A.T., Montevallo
 ELIZABETH F. BUTLER, *Associate County Agent*, 1982. B.S., Cheyney
 DANIEL JONES, *Associate County Agent*, 1982, 1987. B.S., Tuskegee; M.S., Miss. State

Winston County—Double Springs

JEAN P. WEST, *County Agent*, 1972, 1988. B.S., M.Ext.Ed., Alabama;
 RICHARD A. WRIGHT, *Assistant County Agent*, 1977, 1987. B.S., Auburn

Engineering Experiment Station Staff

JAMES E. MARTIN, B.S., M.S., Ph.D., *President*
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Dual roles are performed by faculty and staff of the School of Engineering who serve also as personnel of the Engineering Experiment Station.

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LUELLEN NAGLE, B.S.Ed., *Engineering Public Service Specialist, Birmingham Office*

Dual roles are performed by faculty and staff of the School of Engineering who serve also as personnel of the Engineering Extension Service.

Enrollment Statistics

TABLE I — Enrollment By Curriculum

Fall Quarter, 1988

COLLEGE OF AGRICULTURE

Curriculum	Undergraduate		Graduate		Total
	Male	Female	Male	Female	
Agric. Business and Economics (AEC)	58	15	—	—	73
Agric. Economics and Rural Soc. (AEC)(ECA)	—	—	22	5	27
Agricultural Journalism (AJ)	—	2	—	—	2
Agricultural Science (AG)	14	1	—	—	15
Agronomy and Soils (AY)	28	3	34	4	69
Animal and Dairy Sciences (ADS)	124	97	22	4	247
Entomology (ENT)	2	—	10	3	15
Fisheries and Allied Aqua. (FAA)	21	2	85	15	123
Horticulture (HF)	5	—	8	2	15
Integrated Pest Management (IPM)	4	—	—	—	4
Landscape and Ornamental Horticulture (OH)	57	12	—	—	69
Plant Pathology (PLP)	—	—	5	3	8
Poultry Science (PH)	20	1	9	3	33
Rural Sociology (RSY)	1	—	—	—	1
TOTAL AGRICULTURE	334	133	195	39	701

SCHOOL OF ARCHITECTURE

Architecture (AR)	311	85	—	—	396
Building Science (BSC)	174	7	—	—	181
Community Planning (CP)	—	—	4	6	10
Industrial Design (IND)	80	8	1	1	90
Interior Design (ID)	9	71	—	—	80
Landscape Architecture (LA)	55	7	—	—	62
Pre-Architecture (PAR)	142	54	—	—	196
Pre-Building Science (PBSC)	152	8	—	—	160
Pre-Industrial Design (PIND)	47	3	—	—	50
Pre-Interior Design (PID)	—	18	—	—	18
Pre-Landscape Architecture (PLA)	3	2	—	—	5
TOTAL ARCHITECTURE	973	263	5	7	1,248

COLLEGE OF BUSINESS

Accountancy (AC)	162	158	7	7	334
Business Administration (BA)	3	3	87	36	129
Economics (EC)	30	3	15	6	54
Finance (FI)	215	87	—	—	302
General Business - Theatre (GBT)	1	2	—	—	3
Human Resources Management (HRMN)	20	28	—	—	48
International Business (IB)	66	157	—	—	223
Management (MN)	86	52	21	9	168
Marketing (MK)	189	176	—	—	365
Operations Management (OM)	79	15	—	—	94
Pre-Business (PB)	1,373	978	—	—	2,351
Transportation (TN)	14	2	—	—	16
TOTAL BUSINESS	2,238	1,661	130	58	4,087

COLLEGE OF EDUCATION

Curriculum	Undergraduate		Graduate		Total
	Male	Female	Male	Female	
Adult Education (VAD)	41	5	6	3	55
Agricultural Education (VAG)	34	—	5	—	39
Behavior Disturbance Education (RSB)	1	27	—	1	29
Business Education (VBU)	1	34	—	6	41
Community Agency Counseling (CCA)	—	—	3	9	12
Counseling Psychology (COP)	—	—	9	13	22
Counselor Education (CED)	—	—	18	25	43
Curriculum and Instruction (ACI)	—	—	2	7	9

Curriculum Supervision (ASC)	—	—	1	2	3
Distributive Education (VDE)	4	9	—	—	13
Early Childhood Education (CEC)	1	279	—	14	294
Early Childhood Education for the Handicapped (RSC)	—	27	—	5	32
Educational Leadership (AED)	—	—	2	1	3
Elementary Education (CEE)	11	424	—	22	457
Elementary/Secondary Admin. (AES)	—	—	13	14	27
Exercise Science (HES)	4	5	—	—	9
Field Laboratory (EX)	—	—	9	3	12
General Education (GED)	3	6	—	—	9
Health Education (HHE)	1	2	—	—	3
Health Occupations Educ. (VHO)	1	1	—	—	2
Health & Human Performance (HHP)	1	1	—	—	2
Health & Physical Education (HPE)	35	37	26	27	125
Health, Physical Education & Recreation (HPR)	—	—	—	3	3
Health Promotion (HEP)	6	14	—	—	20
Higher Educ. Admin. (AHE) (AHM)	—	—	16	11	27
Home Economics Education (VHE)	—	8	—	3	11
Industrial Arts Education (VIA)	2	—	—	—	2
Learning Disabilities (RSL)	—	—	1	10	11
Media — Instructional Development (MID)	—	—	1	2	3
Media Specialist (MSE)	—	—	1	10	11
Mental Retardation Education (RSM)	2	20	1	4	27
Middle School - Mathematics (CMM)	—	1	—	—	1
Middle School - Social Science Education (CMS)	—	1	—	—	1
Music Education (CNM)	22	18	4	2	46
N-12 Health Education (HHEN)	1	1	—	—	2
N-12 Physical Education (HPEN)	46	29	—	1	76
Office Administration (VOA)	—	2	—	—	2
Public School Counseling (CPS)	—	—	—	3	3
Reading Specialist (CNR)	—	—	—	6	6
Recreation Administration (HRA)	14	21	—	—	35
Recreation & Sport Management (HRS)	5	2	—	—	7
Rehabilitation and Special Educ. (RSE) (RSH)	—	7	—	11	18
Rehabilitation Counseling (CRC)	—	—	1	9	10
Rehabilitation Service Education (RSR)	6	46	3	9	64
School Psychology/Psychometry (CSP)	—	—	3	10	13
Secondary School - English (CSE)	7	65	7	20	99
Secondary School - Foreign Language (CSF)	—	13	—	—	13
Secondary School - Health (HHS)	1	1	—	—	2
Secondary School - Mathematics (CSM)	43	76	5	10	134
Secondary School - Science (CSC)	21	33	4	7	65
Secondary School - Social Science (CSS)	41	50	4	9	104
Speech Pathology Education (RSS)	—	83	—	—	83
Student Development (CSD)	—	—	4	2	6
Trade and Industrial Education (VTI)	10	7	—	—	17
Vocational and Adult Education (VED)	—	—	20	16	36
TOTAL EDUCATION	365	1,355	169	310	2,199

COLLEGE OF ENGINEERING

Aerospace Engineering (AE)	242	37	25	—	304
Agricultural Engineering (AN)	14	—	7	1	22
Aviation Management:					
Aircraft Systems Mgt. (AMS)	3	—	—	—	3
Airway Science Management (AMA)	10	2	—	—	12
Aviation Management (AM)	38	2	—	—	40
Basic Aviation Mgt. (AMN)	94	10	—	—	104
Professional Flight Mgt. (AMF)	28	2	—	—	30
Chemical Engineering (CHE)	80	34	71	8	193
Civil Engineering (CE)	176	38	55	6	275
Computer Engineering (CPE)	112	24	12	5	153
Computer Science (CS)	36	16	15	6	73
Electrical Engineering (EE)	612	85	69	8	774
Forest Engineering (FYE)	15	—	—	—	15
Industrial Engineering (IE)	110	55	68	9	242
Manufacturing Systems Engr. (MFE)	—	—	16	2	18
Materials Engineering (MTL)	35	7	51	9	102
Mechanical Engineering (ME)	315	38	63	3	419
Pre-Aerospace Engineering (PAE)	264	35	—	—	299
Pre-Agricultural Engineering (PAN)	3	3	—	—	6
Pre-Aviation Management (PAM)	58	8	—	—	66

Pre-Chemical Engineering (PCN).....	49	29	—	—	78
Pre-Civil Engineering (PCN).....	84	8	—	—	92
Pre-Computer Engineering (PCPE).....	40	12	—	—	52
Pre-Computer Science (PCPS).....	29	12	—	—	41
Pre-Electrical Engineering (PEE).....	215	40	—	—	255
Pre-Engineering (PN).....	182	46	—	—	228
Pre-Forestry Engineering (PFYE).....	4	—	—	—	4
Pre-Industrial Engineering (PIE).....	34	17	—	—	51
Pre-Materials Engineering (PMTL).....	6	2	—	—	8
Pre-Mechanical Engineering (PME).....	119	12	—	—	131
Pre-Textile Chemistry (PTC).....	5	2	—	—	7
Pre-Textile Engineering (PTE).....	23	16	—	—	39
Pre-Textile Mgt. and Tech. (PTMT).....	9	3	—	—	12
Textile Chemistry (TC).....	1	2	—	—	3
Textile Engineering (TE).....	6	5	—	—	11
Textile Mgt. and Technology (TMT).....	20	6	—	—	26
Textile Science (TS).....	—	—	2	—	2
TOTAL ENGINEERING.....	3,071	608	454	57	4,190

SCHOOL OF FORESTRY

Forest Products (FP).....	6	—	—	—	6
Forestry (FY).....	69	1	19	4	93
TOTAL FORESTRY.....	75	1	19	4	99

SCHOOL OF HUMAN SCIENCES

Clothing and Textiles (CT).....	2	20	—	—	22
Consumer Affairs (CA).....	—	—	—	5	5
Consumer and Family Economics (CFE).....	1	17	—	—	18
Coordinated Dietetics (CDP).....	1	23	—	—	24
Family and Child Development (FCD).....	20	88	7	16	131
Family Resources Management (FRM).....	—	1	—	—	1
Fashion Merchandising (FM).....	4	193	—	—	197
Food Science (FS).....	—	4	—	—	4
Hotel and Restaurant Mgt. (HRM).....	22	42	—	—	64
Interior Furnishings and Equipment (IFE).....	—	85	—	—	85
Interiors & Housing (IH).....	—	36	—	—	36
Nutrition and Foods (NF).....	7	34	2	11	54
TOTAL HUMAN SCIENCES.....	57	543	9	32	641

COLLEGE OF LIBERAL ARTS

Child Care Social Work (CSW).....	2	18	—	—	20
Communication Disorders (CD).....	—	—	1	28	29
Criminal Justice (CJ).....	82	34	—	—	116
Criminology (SCR).....	27	19	—	—	46
English (EH).....	—	—	11	34	45
Foreign Language - International Trade (FLT).....	33	74	—	—	107
French (FLF).....	—	—	3	15	18
Spanish (FLS).....	—	—	2	14	16
General Curriculum - Anthro. (GAN).....	3	7	—	—	10
General Curriculum - Art (GAT).....	8	14	—	—	22
General Curriculum - Communication Disorders (GCD).....	2	29	—	—	31
General Curriculum - Economics (GEC).....	97	18	—	—	115
General Curriculum - English (GEH).....	41	82	—	—	123
General Curriculum - Foreign Language (GFL).....	10	26	—	—	36
General Curriculum - Geography (GGY).....	18	2	—	—	20
General Curriculum - History (GHY).....	71	43	—	—	114
General Curriculum - Journalism (GJM).....	45	72	—	—	117
General Curriculum - Philosophy (GPA).....	8	3	—	—	11
General Curriculum - Political Science (GPO).....	78	47	—	—	125
General Curriculum - Psychology (GPG).....	106	276	—	—	382
General Curriculum - Religion (GRL).....	6	2	—	—	8
General Curriculum - Social Work (GSW).....	4	37	—	—	41
General Curriculum - Sociology (GSY).....	9	10	—	—	19
General Curriculum - Speech Communication (GSC).....	104	139	—	—	243
General Curriculum - Theatre (GTH).....	15	21	—	—	36
General Curriculum - Undeclared (GLA).....	807	607	—	—	1,414

Health Administration (HA)	16	16	—	—	32
Health Services Adm. (HSA)	9	10	—	—	19
Health Systems Adm. (HSM)	2	5	—	—	7
History (HY)	—	—	25	16	41
Latin-American Studies (LAF)(LAH)	1	1	—	—	2
Political Science (PO)	—	—	12	4	16
Pre-Law (PL)	159	141	—	—	300
Psychology (PG)	—	—	35	56	91
Public Administration (PUB)	25	13	5	11	54
Public Relations - Journalism (PRJ)	22	59	—	—	81
Public Relations - Speech Communication (PRS)	52	159	—	—	211
Speech Communication (SC)	—	—	10	16	26
School of Fine Arts					
Art (AT)	—	—	—	1	1
Music (MU)	17	13	5	3	38
Theatre (TH)	4	7	—	—	11
Visual Arts (VAT)	126	171	—	—	297
TOTAL LIBERAL ARTS	2,009	2,175	109	198	4,491

SCHOOL OF NURSING

Nursing (NUR)	5	80	—	—	85
Pre-Nursing (NS)	3	86	—	—	89
TOTAL NURSING	8	166	—	—	174

SCHOOL OF PHARMACY

Doctor of Pharmacy (PYD)	1	—	—	—	1
Pharmacy (PY)	111	180	19	8	318
Pharmacy Care Systems (PCS)	—	—	3	4	7
TOTAL PHARMACY	112	180	22	12	326

COLLEGE OF SCIENCES AND MATHEMATICS

Applied Mathematics (AMH)	71	38	—	—	109
Applied Physics (APS)	22	1	—	—	23
Biochemistry (BCH)	6	7	—	—	13
Biological Science (BI)	10	14	—	—	24
Botany (BY)	1	—	2	4	7
Chemistry (CH)	13	4	36	20	73
General Curriculum - Chem. (GCH)	3	2	—	—	5
General Curriculum - Earth Science (GGE)	2	—	—	—	2
General Curriculum - Math. (GMH)	7	9	—	—	16
General Curriculum - Micro. (GMB)	1	1	—	—	2
General Curriculum - Physics (GPS)	2	—	—	—	2
General Curriculum - Undeclared (GSM)	105	56	—	—	161
Geology (GL)	17	1	14	2	34
Laboratory Technology (LT)	4	8	—	—	12
Marine Biology (MRB)	24	33	—	—	57
Mathematics (MH)	16	28	37	19	100
Medical Technology (MDT)	7	23	—	—	30
Microbiology (MB)	32	30	5	5	72
Physics (PS)	32	6	40	8	86
Pre-Dentistry (PD)	32	16	—	—	48
Pre-Medicine (PM)	197	126	—	—	323
Pre-Occupational Therapy (OT)	1	2	—	—	3
Pre-Optometry (OP)	13	10	—	—	23
Pre-Pharmacy (PPY)	104	180	—	—	284
Pre-Physical Therapy (PT)	14	45	—	—	59
Pre-Veterinary Medicine (PV)	76	120	—	—	196
Wildlife Management (WL)	58	18	14	5	95
Zoology (ZY)	8	21	17	9	55
TOTAL SCIENCES AND MATHEMATICS	878	799	165	72	1,914

COLLEGE OF VETERINARY MEDICINE

Anatomy and Histology (VAH)	—	—	—	—	—
Large Animal Surgery and Medicine (VLA)	—	—	5	1	6
Pathobiology (VPB)	—	—	1	4	5
Pathology & Parasitology (VPP)	—	—	—	1	1
Physiology and Pharmacology (VPH)	—	—	1	—	1
Small Animal Surgery and Medicine (VSA)	—	—	5	1	6
Veterinary Medicine (VM)	175	170	14	7	366
Veterinary Microbiology (VMI)	—	—	3	4	7
TOTAL VETERINARY MEDICINE	175	170	29	18	392

INTERDEPARTMENTAL PROGRAMS

Environmental Health (ENH)	10	4	—	—	14
Nutrition (NN)	—	—	—	1	1
Physiology (IP)	—	—	3	2	5
Sociology (SY)	—	—	5	6	11
TOTAL INTERDEPARTMENTAL	10	4	8	9	31

TRANSIENTS AND AUDITORS

Transients and Auditors (AUD) (TR)	26	21	8	5	60
TOTAL TRANSIENTS AND AUDITORS	26	21	8	5	60

ALL UNIVERSITY

GRAND TOTAL	10,331	8,079	1,322	821	20,553
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SUMMARY BY CLASS LEVEL

Freshmen	2,703	2,393	—	—	5,096
Sophomores	2,600	1,914	—	—	4,514
Juniors	2,298	1,810	—	—	4,108
Seniors	2,516	1,774	—	—	4,290
Fifth Year	121	89	—	—	210
Other Undergraduates	93	99	—	—	192
Master's	—	—	791	509	1,300
Educational Specialists	—	—	—	—	—
Doctoral	—	—	415	203	618
Post-Doctoral	—	—	1	—	1
Other Graduates	—	—	115	109	224
GRAND TOTAL	10,331	8,079	1,322	821	20,553

TABLE II — Enrollment By Alabama Counties
Fall Quarter, 1988

County	Male	Female	Total
Autauga	72	53	125
Baldwin	185	158	343
Barbour	61	54	115
Bibb	8	4	12
Blount	32	32	64
Bullock	9	10	19
Butler	34	24	58
Calhoun	150	75	225
Chambers	119	116	235
Cherokee	36	25	61
Chilton	34	18	52
Choctaw	11	1	12
Clarke	42	23	65
Clay	23	13	36
Cleburne	14	14	28
Coffee	105	92	197
Colbert	51	37	88
Conecuh	18	13	31
Coosa	11	9	20
Covington	62	63	125
Crenshaw	20	14	34
Cullman	70	54	124
Dale	90	71	161
Dallas	56	53	109
DeKalb	47	34	81
Elmore	79	67	146
Escambia	69	45	114
Etowah	161	97	258
Fayette	6	16	22
Franklin	18	10	28
Geneva	52	33	85
Greene	4	4	8
Hale	6	6	12
Henry	39	20	59
Houston	215	153	368
Jackson	64	51	115
Jefferson	1,021	859	1,880
Lamar	6	4	10
Lauderdale	88	64	152
Lawrence	13	10	23
Lee	853	741	1,594
Limestone	71	43	114
Lowndes	12	16	28
Macon	27	41	68
Madison	626	442	1,068
Marengo	26	20	46
Marion	23	18	41
Marshall	104	65	169
Mobile	392	311	703
Monroe	39	32	71
Montgomery	523	410	933
Morgan	187	124	311
Perry	14	5	19
Pickens	8	8	16
Pike	34	36	70
Randolph	50	58	108
Russell	102	93	195
Shelby	105	110	215
St. Clair	54	31	85
Sumter	13	5	18
Talladega	108	98	206
Tallapoosa	105	126	231
Tuscaloosa	42	32	74
Walker	27	24	51
Washington	15	12	27
Wilcox	15	17	32
Winston	17	13	30
TOTAL (Alabama)	6,793	5,430	12,223

TABLE III — Enrollment By States And Territories
Fall Quarter, 1988

State	Male	Female	Total
Alaska	2	3	5
Arizona	11	1	12
Arkansas	43	17	60
California	54	24	78
Colorado	14	8	22
Connecticut	24	9	33
Delaware	9	4	13
Florida	1,016	845	1,861
Georgia	1,383	1,168	2,551
Hawaii	3	—	3
Idaho	6	2	8
Illinois	60	48	108
Indiana	17	16	33
Iowa	10	5	15
Kansas	8	5	13
Kentucky	154	108	262
Louisiana	113	80	193
Maine	7	4	11
Maryland	60	39	99
Massachusetts	18	10	28
Michigan	27	20	47
Minnesota	6	4	10
Mississippi	75	68	143
Missouri	32	18	50
Montana	4	8	12
Nebraska	7	2	9
Nevada	6	1	7
New Hampshire	8	4	12
New Jersey	54	24	78
New Mexico	10	7	17
New York	83	40	123
North Carolina	67	54	121
Ohio	58	34	92
Oklahoma	13	6	19
Oregon	4	5	9
Pennsylvania	55	35	90
Rhode Island	4	3	7
South Carolina	144	80	224
South Dakota	4	—	4
Tennessee	436	328	764
Texas	82	62	144
Utah	11	1	12
Vermont	4	1	5
Virginia	132	84	216
Washington	15	6	21
West Virginia	7	9	16
Wisconsin	15	10	25
Wyoming	—	2	2
TOTAL—Other States	4,375	3,312	7,687
TOTAL—All States	11,168	8,742	19,910

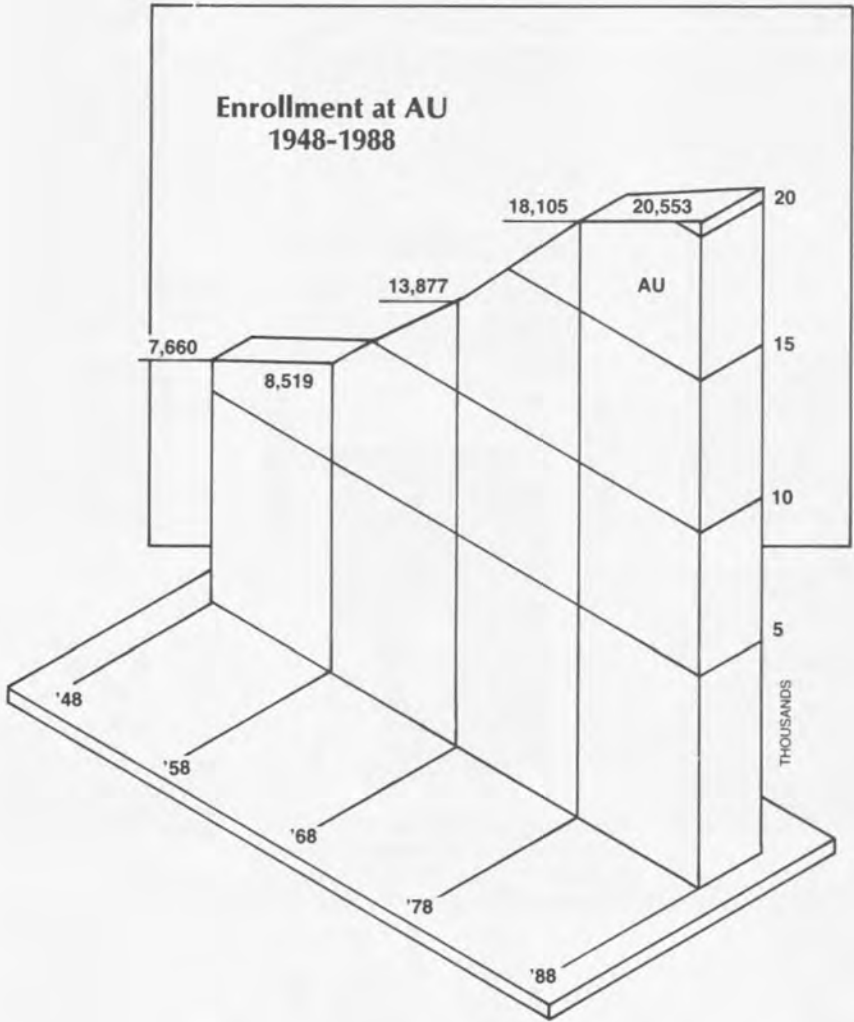
United States Territories and Possessions

Puerto Rico	1	4	5
TOTAL—U.S. Territories and Possessions	1	4	5

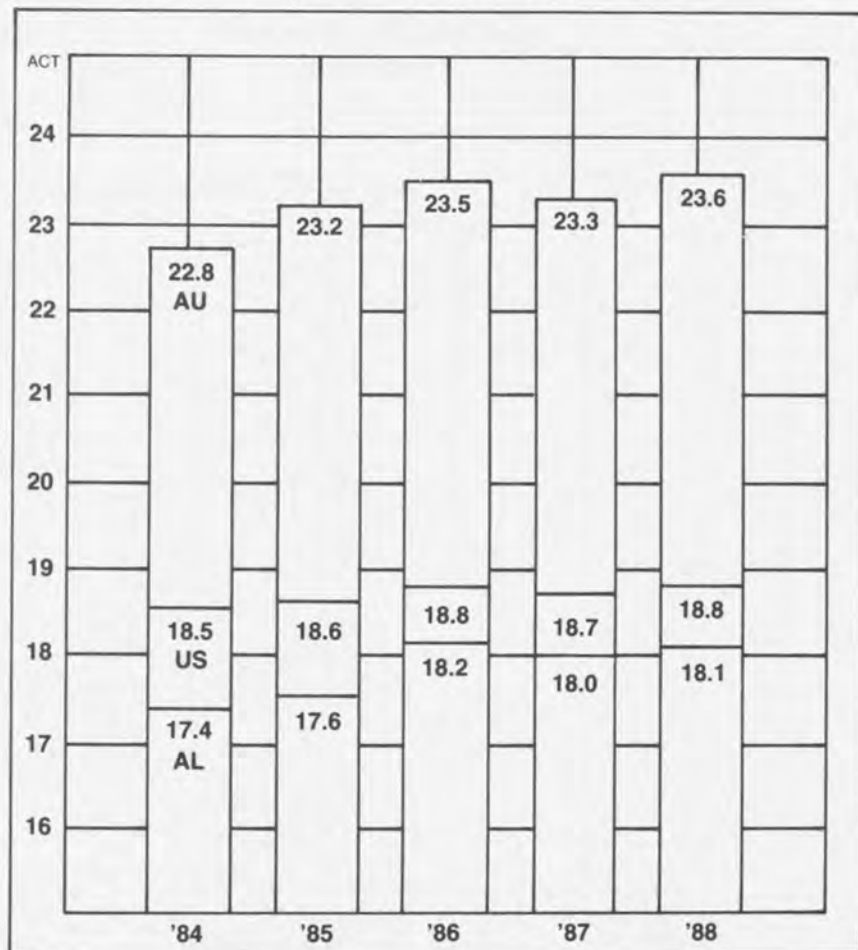
TABLE IV — Enrollment By Foreign Country
Fall Quarter, 1988

Foreign Country	Male	Female	Total
Argentina	—	1	1
Australia	2	2	4
Austria	—	1	1
Bahamas	—	1	1
Bangladesh	4	1	5
Belgium	—	1	1
Bermuda	1	1	2
Brazil	4	2	6
Burundi	1	—	1
Cameroon	3	—	3
Canada	11	6	17
China (PRC)	23	12	35
Colombia	2	1	3
Dominican Republic	2	—	2
Ecuador	1	—	1
Egypt	11	2	13
El Salvador	1	1	2
Ethiopia	1	—	1
France	1	6	77
Greece	2	1	3
Guatemala	2	—	2
Guyana	—	1	1
Haiti	2	—	2
Honduras	2	1	3
Hong Kong	—	2	2
India	80	9	89
Indonesia	6	—	6
Iran	—	1	1
Italy	1	1	2
Ivory Coast	2	—	2
Jamaica	3	2	5
Japan	4	1	5
Korea	35	2	37
Kuwait	1	—	1
Lebanon	6	—	6
Liberia	1	—	1
Malawi	1	—	1
Malaysia	7	—	7
Mali	4	—	4
Mexico	10	1	11
Morocco	2	—	2
Netherlands	4	2	6
Nicaragua	2	1	3
Nigeria	9	2	11
Norway	—	1	1
Pakistan	7	—	7
Panama	—	1	1
Peru	—	1	1
Philippine Islands	3	4	7
Poland	—	1	1
Portugal	13	10	23
Rwanda	1	—	1
Saudi Arabia	1	—	1
Singapore	2	—	2
South Africa	3	—	3
Spain	3	2	5
Sri Lanka	3	2	5
Sweden	1	2	3
Syria	1	—	1
Taiwan	164	40	204
Tanzania	1	—	1
Thailand	11	1	12
Trinidad & Tobago	—	1	1
Turkey	1	1	2
Uganda	1	—	1
United Kingdom	7	14	21
Uruguay	1	—	1
Venezuela	1	3	4
Vietnam	1	—	1
West Germany	1	5	6
Yugoslavia	1	—	1
Zaire	1	—	1
Zimbabwe	1	—	1
TOTAL (Foreign)	484	154	638

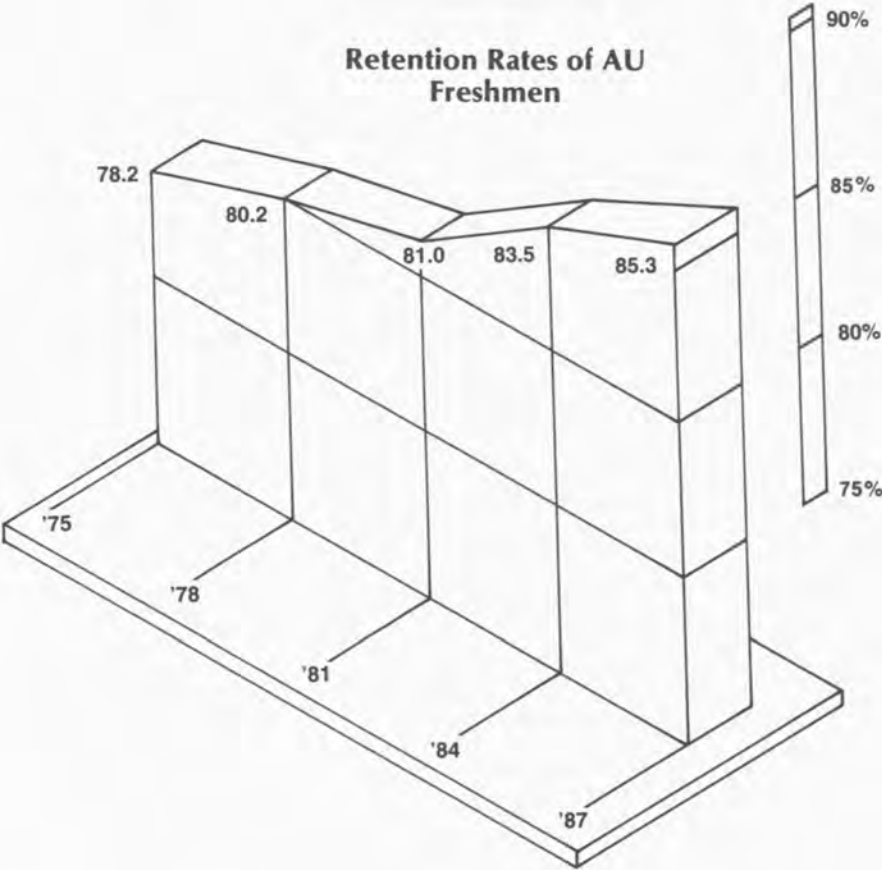




Enrollment at Auburn has climbed steadily for the past 40 years. Following World War II, enrollment surged from 2,608 in 1945 to 7,660 three years later. A steady but dramatic increase since 1948 has seen on-campus enrollment rise 168 percent to 20,553 in fall quarter, 1988.

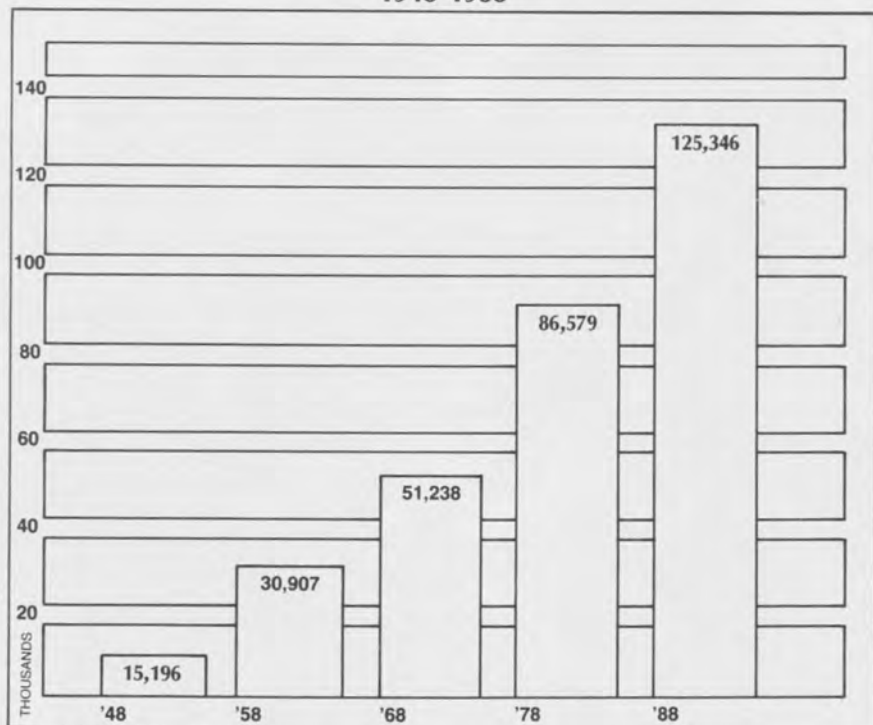
AU, State and National ACT Trends 1984-1988

The quality of Auburn students has long been high and continues to far outpace the average for the state, region and nation. In 1988, the average American College Test (ACT) score of entering freshmen at Auburn was 23.6. By contrast, the average for the state and nation was 18.1 and 18.8, respectively.



Students are coming to Auburn prepared for college work and more are able to complete their studies than in the past. A survey of retention rates of freshmen conducted every three years shows a dramatic increase in the percentage returning for their sophomore year.

Cumulative Total Degrees Awarded 1948-1988



From its founding in 1856 through 1948, Auburn awarded 15,196 degrees. The degrees awarded by Auburn had doubled by 1958 to 30,907. In the next decade, the total number of awarded degrees had increased to 51,238. The total number of degrees awarded at the main campus rose to 86,569 by 1978, and to 125,346 in 1988.



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